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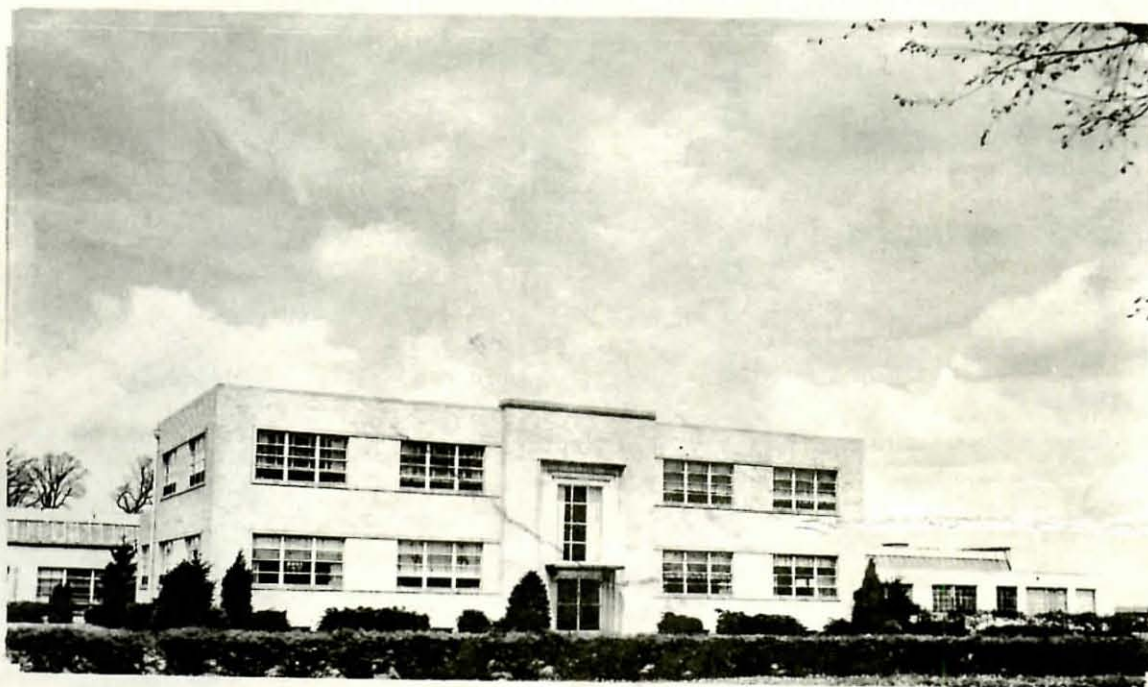
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# THE OHIO STATE UNIVERSITY



## RESEARCH FOUNDATION

USNC-IGY ANTIARCTIC GLACIOLOGICAL DATA  
FIELD WORK 1957 AND 1958

(Ross Ice Shelf Traverse)

Report 825-1-Part IV  
IGY Project No. 4.10  
NSF Grant No. Y/4.10/285

Richard P. Goldthwait  
January 1960

USNC-IGY ANTARCTIC GLACIOLOGICAL DATA  
Report Number 1: Field Work 1957-58

Part IV

ROSS ICE SHELF TRAVERSE

The Ohio State University  
Research Foundation  
Columbus 12, Ohio

Project 825, Report No. 1, Part IV

submitted by

Richard P. Goldthwait  
Department of Geology

to the

U. S. National Committee for the IGY  
National Academy of Sciences, in partial fulfillment  
of IGY Project Number 4.10 - NSF Grant No. Y/4.10/285

January 1960



# 1957-58 IGY ROSS ICE SHELF TRAVERSE

Data Collected by Walter W. Boyd, Jr.

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IGY L. A.-ROSS ICE SHELF TRAVERSE

1957-58

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Data Collected by Walter W. Boyd, Jr.

## L. A.-ROSS ICE SHELF TRAVERSE

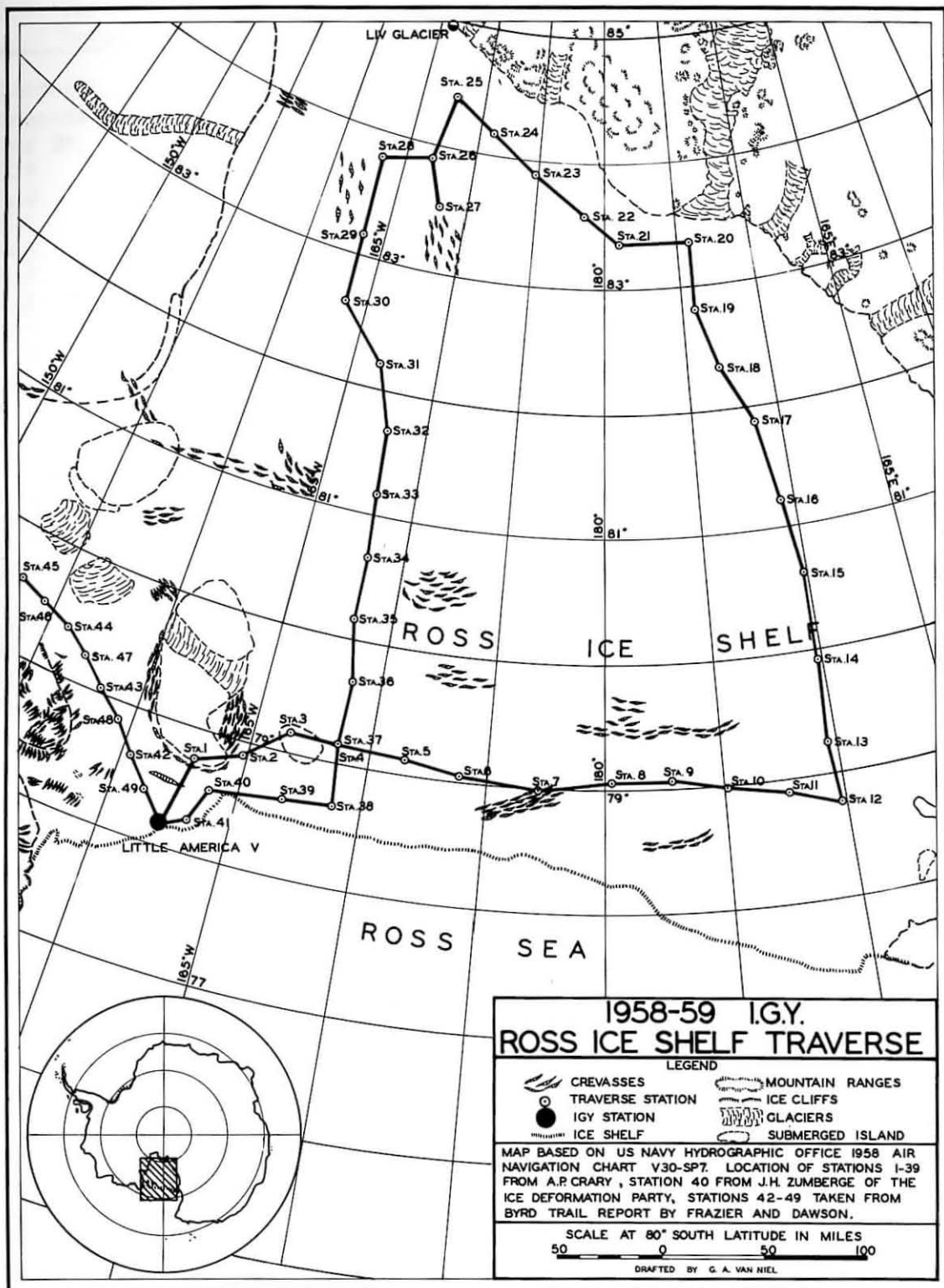
### Introduction

The data presented in this volume were collected on the Ross Ice Shelf Traverse of 1957-1958 by Walter W. Boyd, Jr. The large number of observations for each pit precluded presentation on the scale regularly used in this series of publications. In this report each diagram represents a 3-meter pit. It should also be noted that both the rammsonde and temperature scales have been altered from those ordinarily used. The stratigraphic data sheet which accompanies most of the pits gives the dominant grain sizes of each stratum and the ratio of relative abundance of these grain sizes.

Analysis of the material presented in this volume will define the average snow accumulation on the Ross Ice Shelf.

Mr. Boyd was assisted in the preparation of this material by George Van Niel of the Glaciological Data Reduction Center, The Ohio State University, Columbus, Ohio.

Richard L. Cameron  
Chief Scientist  
IGY Glaciology Data Reduction Center



## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Schoeck, Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 0.2		77.9-79.5	53.2	42.4-44.0	59.5
Ramsonde #1		79.5-80.5	43.2	44.0-45.0	63.2
October 26, 1957		80.5-81.7	36.5	45.0-46.9	50.6
0 -22.9	3.3	81.7-82.4	46.0	46.9-48.0	39.6
22.9-24.2	18.6	82.4-83.2	29.9	48.0-48.8	28.2
24.2-25.1	25.4	83.2-84.0	29.9	48.8-50.0	36.5
25.1-26.5	17.5	84.0-85.0	43.2	50.0-51.0	43.2
26.5-27.8	7.0	85.0-85.8	53.2	51.0-52.3	49.4
27.8-36.5	3.8	85.8-86.9	57.8	52.3-53.0	31.8
36.5-37.3	15.7	86.9-88.8	50.6	53.0-54.3	34.0
37.3-37.8	23.2	88.8-89.7	47.6	54.3-55.1	53.2
37.8-38.5	31.8	89.7-90.9	53.2	55.1-56.0	69.9
38.5-39.6	30.5	90.9-91.6	60.4	56.0-57.1	76.0
39.6-40.5	47.7	91.6-92.0	53.2	57.1-58.0	47.6
40.5-41.4	47.7	92.0-93.3	64.8	58.0-59.3	34.0
41.4-42.2	53.2	93.3-94.2	92.1	59.3-60.0	31.8
42.2-43.2	63.2	94.2-95.0	103.2	60.0-60.8	28.2
43.2-44.1	69.9	95.0-96.2	86.6	60.8-62.0	53.2
44.1-45.6	63.2	96.2-97.3	94.2	62.0-63.0	63.2
45.6-46.9	72.4	97.3-98.6	80.2	63.0-64.0	63.2
46.9-47.9	93.2	98.6-99.8	69.8	64.0-65.0	43.2
47.9-49.4	83.2			65.0-66.2	36.5
49.4-50.0	103.2	Station 0.2		66.2-67.2	43.2
50.0-50.8	53.2	Ramsonde #2		67.2-68.0	53.2
50.8-52.8	43.2	October 26, 1957		68.0-69.0	63.2
52.8-54.0	36.5	0 -20.4	3.3	69.0-70.0	63.2
54.0-56.0	33.2	20.4-21.2	228.2	70.0-71.0	63.2
56.0-57.4	31.8	21.2-21.9	174.7	71.0-72.0	63.2
57.4-58.0	36.5	21.9-22.7	190.7	72.0-73.0	43.2
58.0-59.5	16.5	22.7-23.4	217.2	73.0-74.2	53.2
59.5-60.1	36.5	23.4-24.1	174.7	74.2-75.0	53.2
60.1-62.0	13.7	24.1-25.0	203.2	75.0-76.0	63.2
62.0-62.5	43.2	25.0-26.3	164.7	76.0-77.0	63.2
62.5-63.4	47.7	26.3-27.1	190.7	77.0-78.0	63.2
63.4-64.5	57.7	27.1-28.1	153.2	78.0-79.0	103.2
64.5-66.5	48.2	28.1-29.5	131.7	79.0-80.0	63.2
66.5-69.0	27.2	29.5-32.8	88.2	80.0-81.2	53.2
69.0-69.7	31.8	32.8-33.9	76.0	81.2-82.0	78.2
69.7-70.5	29.9	33.9-34.5	69.9	82.0-83.0	63.2
70.5-71.5	33.2	34.5-35.6	39.6	83.0-84.0	63.2
71.5-72.4	36.5	35.6-36.8	36.5	84.0-85.1	85.0
72.4-73.1	46.0	36.8-37.5	31.8	85.1-86.1	93.2
73.1-74.1	63.2	37.5-38.0	43.2	86.1-87.1	93.2
74.1-75.0	69.9	38.0-39.0	33.2	87.1-88.1	63.2
75.0-76.0	63.2	39.0-40.0	43.2	88.1-88.8	38.5
76.0-76.7	88.9	40.0-41.1	39.6	88.8-89.8	93.2
76.7-77.9	69.9	41.1-42.4	49.4	89.8-91.1	72.4



## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf TraverseObservers Schoeck, Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
91.1-92.6	43.2	22.5-23.0	12.2	66.0-67.2	102.2
92.6-94.5	34.8	23.0-23.5	32.2	67.2-68.3	111.2
94.5-96.0	43.2	23.5-24.0	32.2	68.3-69.0	87.9
96.0-97.0	63.2	24.0-24.5	62.2	69.0-70.0	82.2
97.0-97.8	78.2	24.5-25.0	102.2	70.0-71.0	102.2
97.8-99.0	78.2	25.0-26.0	102.2	71.0-72.0	82.2
Station Mile 23, #1 Stop 0.6 October 26, 1957		26.0-27.0	82.2	72.0-73.0	102.2
		27.0-28.0	52.2	73.0-74.0	92.2
		28.0-29.0	52.2	74.0-75.2	77.2
		29.0-30.0	42.2	75.2-76.0	102.2
		30.0-31.2	27.2	76.0-77.0	62.2
		31.2-32.0	27.2	77.0-78.0	82.2
		32.0-33.0	32.2	78.0-79.0	62.2
		33.0-34.0	62.2	79.0-80.0	62.2
		34.0-35.0	122.2	Station Beside Rift Valley #1 Stop 0.8 October 26, 1957	
		35.0-35.5	202.2		
34.0-35.0	22.2	35.5-36.0	202.2		
35.0-36.0	22.2	36.0-37.0	202.2		
36.0-37.0	22.2	37.0-38.0	222.2		
37.0-38.2	27.2	38.0-39.0	122.2		
38.2-39.0	64.7	39.0-40.0	102.2		
39.0-40.0	122.2	40.0-41.0	82.2		
40.0-41.0	162.2	41.0-42.0	62.2		
41.0-42.0	182.2	42.0-43.0	42.2		
42.0-43.0	122.2	43.0-44.0	42.2	0 -21.0	0
43.0-43.8	114.7	44.0-45.0	42.2	21.0-22.0	53.2
43.8-45.0	135.7	45.0-46.2	27.2	22.0-23.0	63.2
45.0-46.0	142.2	46.2-47.0	27.2	23.0-24.0	43.2
46.0-46.5	202.2	47.0-48.0	32.2	24.0-25.0	43.2
46.5-47.3	152.2	48.0-49.0	42.2	25.0-26.0	33.2
47.3-48.3	162.2	49.0-50.0	52.2	26.0-27.1	39.6
48.3-48.8	202.2	50.0-51.0	52.2	27.1-28.0	36.5
48.8-49.5	216.4	51.0-52.0	52.2	28.0-29.0	43.2
49.5-50.5	212.2	52.0-53.0	62.2	29.0-30.0	63.2
50.5-51.1	168.9	53.0-54.0	92.2	30.0-31.2	36.5
51.1-51.7	152.2	54.0-55.0	162.2	31.2-32.2	33.2
51.7-52.5	189.7	55.0-56.2	185.6	32.2-33.0	40.7
52.5-53.2	259.3	56.2-57.0	152.2	33.0-34.0	73.2
53.2-54.0	189.7	57.0-58.0	102.2	34.0-35.0	123.2
54.0-55.0	212.2	58.0-59.0	182.2	35.0-36.0	163.2
55.0-55.8	227.2	59.0-60.0	182.2	36.0-37.0	123.2
55.8-56.6	189.7	60.0-60.6	235.4	37.0-38.0	143.2
56.6-57.3	231.0	60.6-61.0	202.2	38.0-39.0	143.2
57.3-58.5	202.2	61.0-62.0	222.2	39.0-40.0	203.2
58.5-59.6	184.2	62.0-63.0	222.2	40.0-41.0	133.2
59.6-60.5	180.0	63.0-64.0	222.2	41.0-42.0	243.2
60.5-61.3	102.2	64.0-65.0	182.2	42.0-43.0	333.2
61.3-62.0	116.5	65.0-66.0	142.2	43.0-44.0	323.2
Station Mile 23, #1 Stop 0.6 October 26, 1959				44.0-45.0	283.2
				45.0-46.0	323.2
				46.0-47.0	283.2
				47.0-48.0	323.2
				48.0-49.0	245.2

## RAM HARDNESS DATA SHEET

 Station Ross Ice Shelf Traverse  
 Observers Boyd, Schoeck

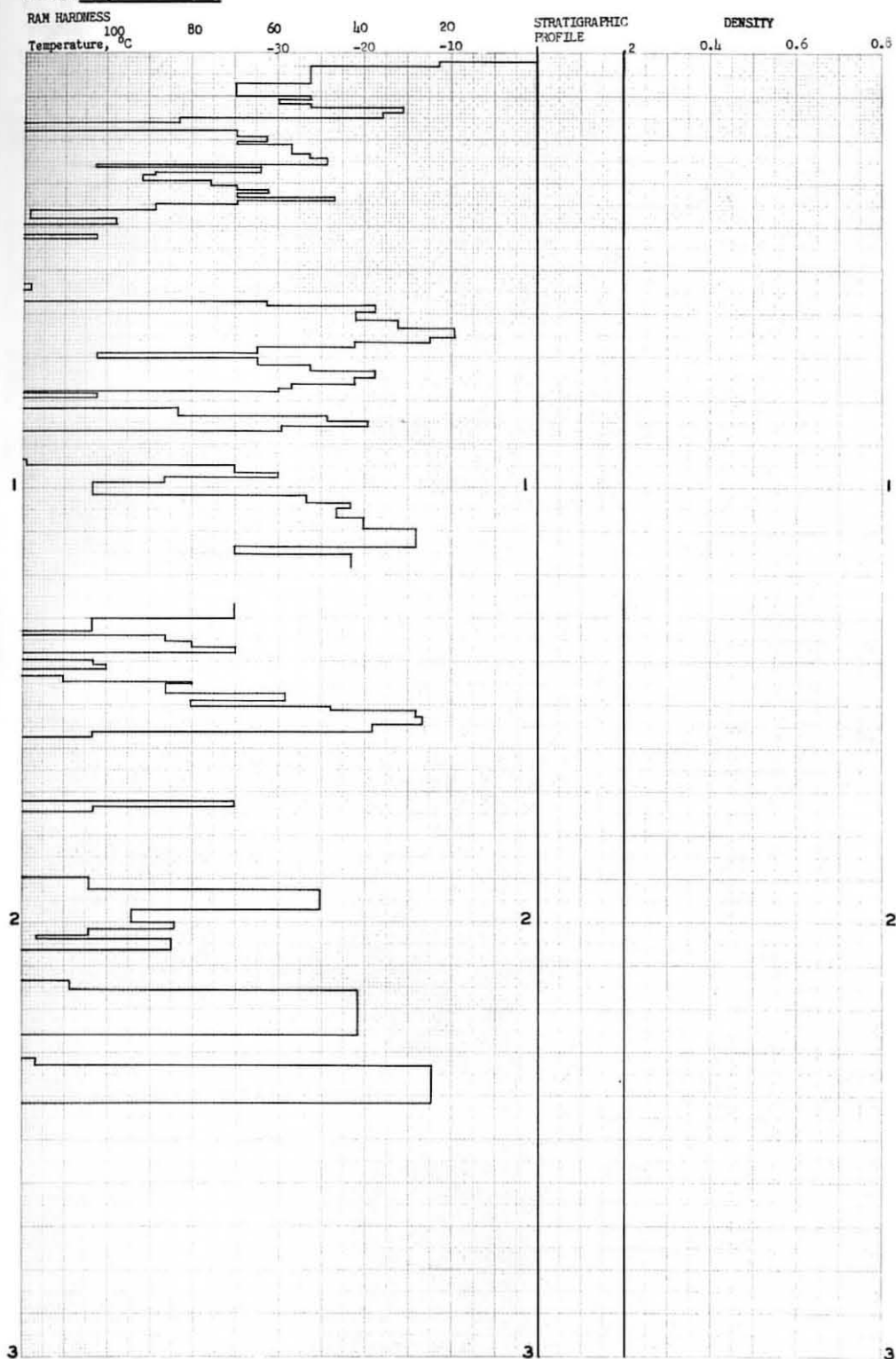
Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
49.0-50.0	245.2	Station Beside Rift		72.0-73.0	182.2
50.0-51.0	185.2	Valley #2		73.0-74.3	94.6
51.0-51.2	155.2	Stop 0.8		74.3-75.2	102.4
51.2-53.5	57.4	October 26, 1957		75.2-77.7	38.2
53.5-54.8	97.6	0 - 4.0	0	77.7-81.5	25.9
54.8-56.2	90.9	4.0-24.5	2.7	81.5-84.2	35.5
56.2-57.4	55.2	24.5-25.0	22.2	84.2-86.3	45.1
57.4-58.5	59.8	25.0-26.0	42.2	86.3-87.8	62.2
58.5-59.5	65.2	26.0-27.0	32.2	87.8-89.1	71.5
59.5-60.5	65.2	27.0-28.0	42.2	89.1-90.8	55.3
60.5-61.5	65.2	28.0-29.0	42.2	90.8-92.1	71.5
61.5-62.2	90.9	29.0-30.0	62.2	92.1-93.5	66.4
62.2-63.8	42.7	30.0-31.0	42.2	93.5-95.7	43.3
63.8-64.4	105.2	31.0-32.5	28.9	95.7-99.0	29.5
64.4-64.8	155.2	32.5-34.5	32.2	Station Before Valley	
64.8-65.2	155.2	34.5-35.7	35.5	by Roosevelt Island	
65.2-66.0	155.2	35.7-37.0	33.0	Stop 0.10	
66.0-67.1	168.8	37.0-38.0	42.2	October 26, 1957	
67.1-68.0	205.2	38.0-39.0	42.2	0 - 7.8	0
68.0-69.0	245.2	39.0-40.0	62.2	7.8-8.8	32.2
69.0-70.3	189.2	40.0-41.0	82.2	8.8-10.1	40.7
70.3-71.0	90.9	41.0-42.2	77.2	10.1-11.7	39.7
71.0-72.2	105.2	42.2-43.2	92.2	11.7-12.8	38.6
72.2-73.0	80.2	43.2-44.0	152.2	12.8-13.7	46.6
73.0-74.5	45.2	44.0-45.0	182.2	13.7-14.8	38.6
74.5-75.5	65.2	45.0-46.2	152.2	14.8-15.5	59.3
75.5-76.5	65.2	46.2-47.2	122.2	15.5-17.1	39.7
76.5-77.8	51.4	47.2-48.0	77.2	17.1-18.4	40.7
77.8-79.2	48.0	48.0-49.3	94.6	18.4-19.2	52.2
79.2-80.4	55.2	49.3-50.1	152.2	19.2-20.3	38.6
80.4-81.5	59.8	50.1-53.0	43.6	20.3-21.3	42.2
81.5-85.0	18.5	53.0-54.0	62.2	21.3-22.2	35.5
85.0-86.0	35.2	54.0-56.2	56.8	22.2-23.0	33.5
86.0-87.5	45.2	56.2-58.0	68.8	23.0-23.7	59.3
87.5-88.0	65.2	58.8-59.5	82.3	23.7-24.1	77.2
88.0-88.5	65.2	59.5-61.2	72.7	24.1-25.0	113.2
88.5-89.2	48.0	61.2-63.2	62.2	25.0-26.3	163.7
89.2-90.0	42.7	63.2-64.5	94.6	26.3-27.4	247.5
90.0-90.5	65.2	64.5-65.3	152.2	27.4-27.9	242.2
90.5-91.5	65.2	65.3-66.1	152.2	27.9-28.8	224.4
91.5-92.5	65.2	66.1-67.0	135.4	28.8-29.5	230.5
92.5-93.2	48.0	67.0-68.1	220.3	29.5-30.0	242.2
93.2-94.5	28.3	68.1-69.0	135.4	30.0-30.6	268.7
94.5-95.8	51.4	69.0-70.0	182.2	30.6-31.7	147.6
95.8-97.5	40.5	70.0-71.0	182.2	31.7-32.3	202.2
97.5-99.0	45.2	71.0-72.0	242.2		

## RAM HARDNESS DATA SHEET

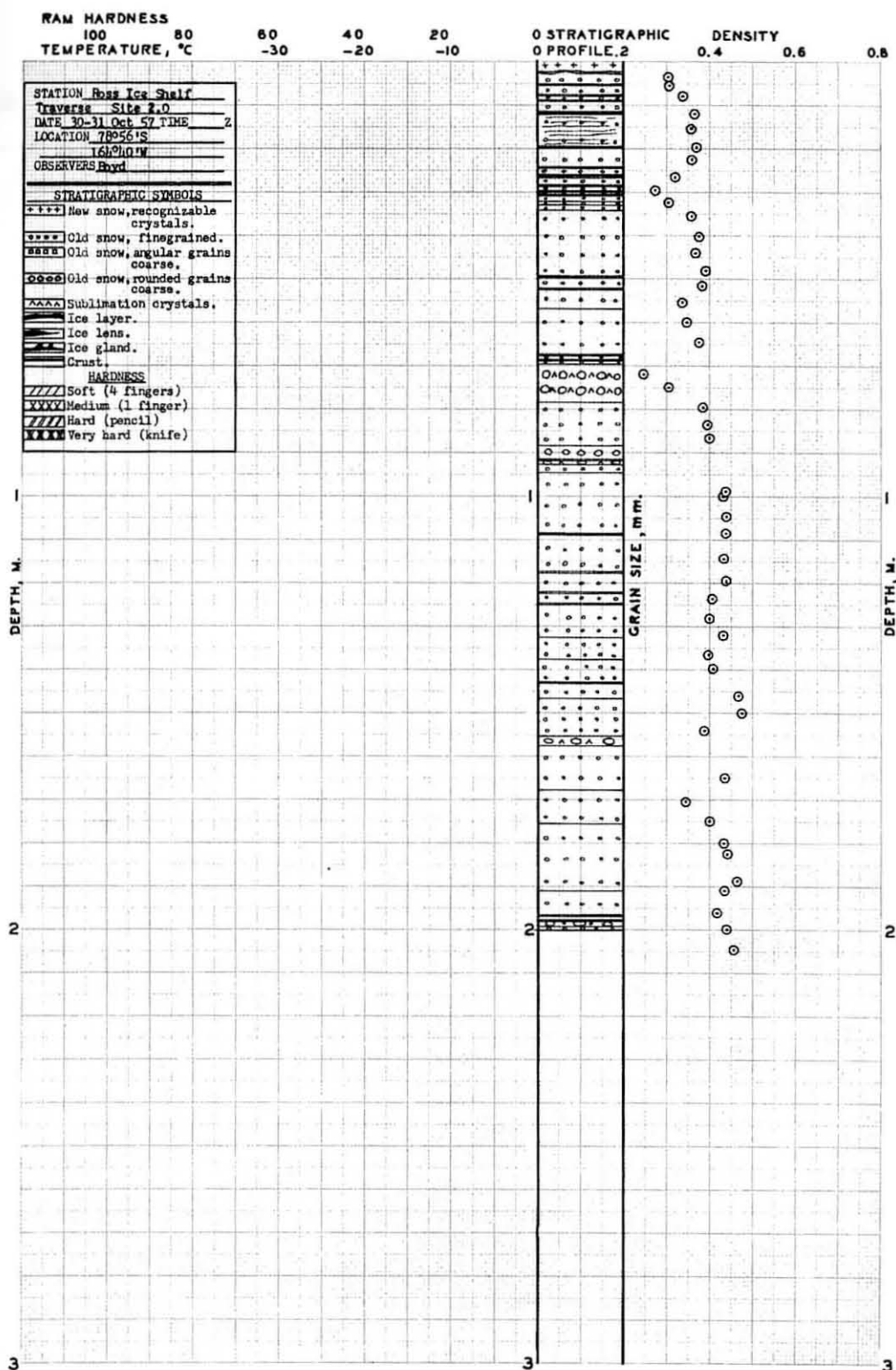
Station Ross Ice Shelf Traverse  
Observers Boyd, Schoeck

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
32.3-33.1	152.2				
33.1-34.1	162.2				
34.1-35.0	102.2				
35.0-36.0	152.2				
36.0-37.0	242.2				
37.0-38.0	152.2				
38.0-38.9	168.9				
38.9-40.0	184.0				
40.0-41.0	162.2				
41.0-42.3	156.1				
42.3-43.1	152.2				
43.1-44.0	180.0				
44.0-45.0	202.2				
45.0-46.0	242.2				
46.0-47.0	302.2				
47.0-48.1	275.1				
48.1-49.0	280.1				
49.0-50.0	252.2				
50.0-51.0	302.2				

STATION Ross Ice Shelf  
 Traverse Site 1.0  
 DATE  
 LOCATION 78°47'S  
 162°55'W  
 OBSERVER Boyd







Ross Ice Shelf Traverse  
 Station Site 2.0  
 Date 30 October 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 2.3	.1>.1/.2	3:1	2 cms of new-fallen snow above
2.3			Crust, irregular
2.3- 5.1	.2-.5/.1	2:1	Loose grains
5.1			Crust
5.1- 7.3	.1/.2-.5	2:1	
7.3			Crust
7.3- 8.7	.5/.2-.1	2:1	
8.7			Crust
8.7-11.3	.2-.3/.5	2:1	
11.3			Crust
11.3-11.9	.5/.3-.6	2:1	
11.9			Crust
11.9-19.6	.2/.3-.1		
	occ. .5	2:1	Light wind layering throughout
19.6			Crust
19.6-24.1	.2-.3/.1	2:1	
24.1			Crust
24.1-25.8	.5-.6/.7		
	occ. .8	2:1	
25.8-25.9			Crust
25.9-28.2	.2-.3/.5	2:1	
28.2-28.4	.8 to 1.0		Zone of enlarged grains
28.4-29.5	.2-.3/.4	2:1	
29.5-30.4	.6 to .8		Loose, even pack
30.4-30.6	.3/.4-.5	2:1	
30.6-32.0	.5 to .7		Loose grains
32.0-32.7	.2/.3-.4	2:1	Slightly cemented
32.7-34.0	.3-.4/.5	3:1	Slightly cemented
34.0-49.4	.5-.6/.8		
	occ. 1.0	3:2	Loose
49.4-49.6	.5 to .8		Slight crust of enlarged grains
49.6-52.0	.7/1.0	2:1	
52.0-52.2			Crust
52.2-56.8	1.2-1.3/1.5	3:2	
56.8-67.5	1.0-1.1/1.2-1.3	3:2	
67.5			Crust
67.5-68.4	1.0 to 1.3		Loose grains
68.4			Crust
68.4-69.3	1.0/.7-.8		
	occ. 1.1-1.2	3:1	Slight cementing
69.3-78.3	6.0-7.0/4.0-5.0		
	8.0	2:1	Loose--some cup-shaped crystals
78.3-88.1	1.0-1.1/1.2-1.3	2:1	Hard packed

Ross Ice Shelf Traverse  
 Station Site 2.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
88.1- 88.2			Crust
88.2- 91.6	4.0-5.0/6.0-3.0	3:2	Very loose
91.6- 92.3			Crust of 5.0-6.0 grains, some cup shaped
92.3- 94.3	1.2-1.5/1.0-2.0	3:1	Slightly cemented
94.3-108.1	.6-.7/1.0	2:1	Very hard packed
108.1-109.0			Large ice lens or gland
109.0-117.2	.6-.8/1.0-1.2	3:2	Slightly cemented
117.2			Crust
117.2-122.0	.5-.6/.8-1.0	2:1	Slightly cemented
122.0			Crust
122.0-124.8	.6/.8-1.0	3:1	
124.8-125.0			Crust of cemented grains .6 to .8 mm
125.0-132.6	1.0-1.1/.8-1.2	3:1	Loose
132.6			Crust
132.6-137.6	.7-.8/.5-1.0	3:1	Well cemented
137.6-143.0	1.0-1.1/1.2-1.5	3:1	Loose
143.0			Crust
143.0-146.7	.7/.8-1.0	3:1	Well cemented
146.7-155.1	.6-.7/.8	2:1	
155.1-157.5	2.0-3.0/4.0-6.0	2:1	Cup shaped crystals, slightly cemented, loose
157.5-167.7	.8-1.0/.7-.6	2:1	Well cemented
167.7-175.3	1.2-1.3/1.0-1.5	2:1	Slightly cemented
175.3-191.3	.8/.6-.7 occ. 1.0	2:1	Well cemented
191.3-196.7	1.0-1.1/.8-1.2	2:1	Well cemented
196.7			Crust
196.7-197.3	1.0-1.2/1.3-1.5	3:1	Well cemented
197.3-197.5			Crust of ice and enlarged grains 3.0-4.0 mm with air spaces
197.5-199.1	1.3-1.5/1.7	3:2	Loose
	occ. 2.0-2.5		
199.1-200.0	.7-.8/.5-1.0	4:1	

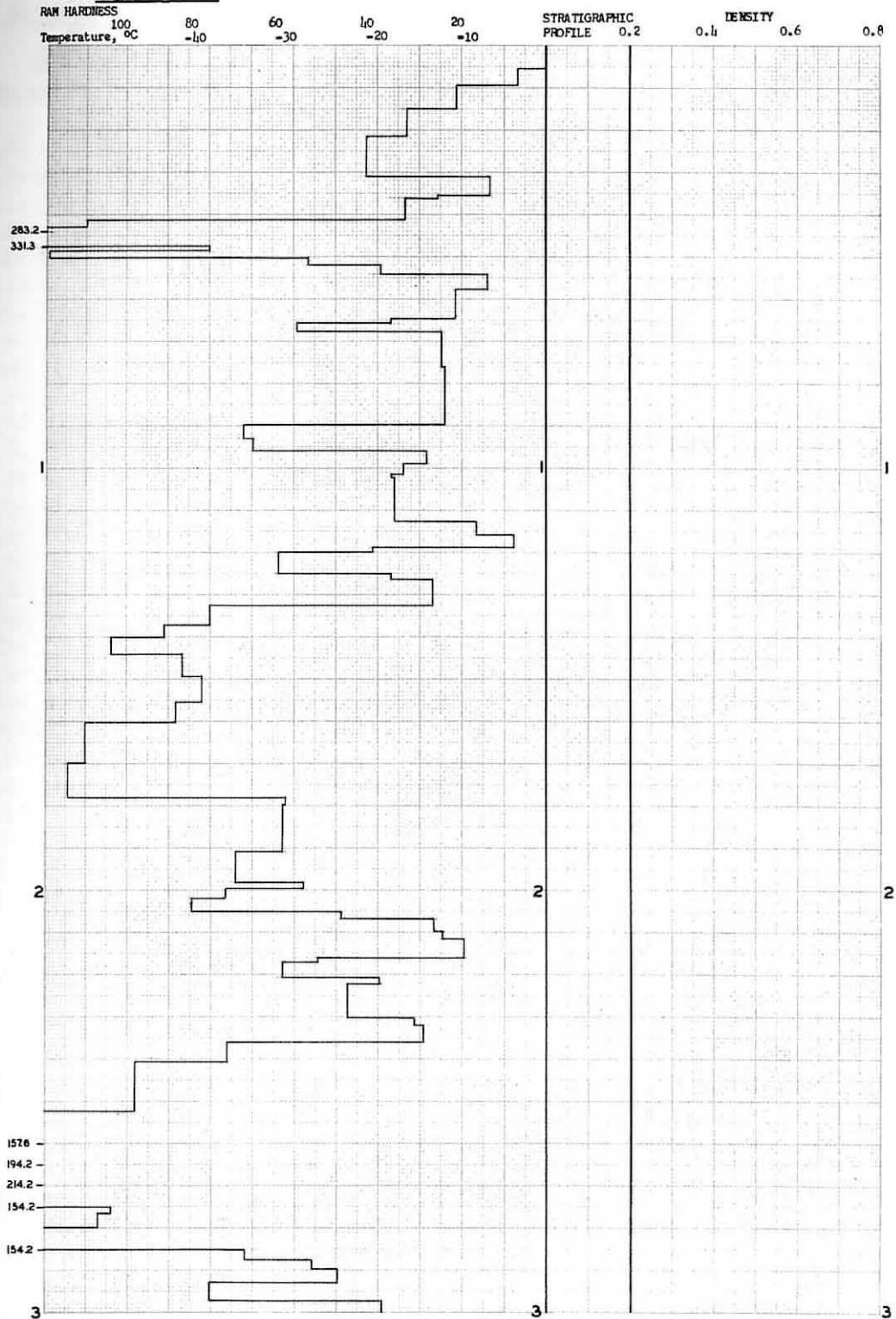
## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd, Smith

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 2.12		149.1-150.8	27.7	94.8- 96.1	19.6
November 12, 1957		150.8-154.2	30.7	96.1-101.2	33.6
0 - 6.2	3.4	154.2-154.5	70.8	101.2-104.3	42.9
6.2- 8.2	8.2	154.5-160.0	66.0	104.3-106.5	22.4
8.2- 11.1	23.9	160.0-162.0	154.2	106.5-110.0	29.9
11.1- 14.5	20.9	162.0-164.2	167.7	110.0-120.1	39.8
14.5- 16.2	15.0	164.2-165.3	76.9	120.1-124.3	51.9
16.2- 20.0	32.1	165.3-169.4	40.8	124.3-125.6	35.0
20.0- 24.0	63.2	169.4-171.5	51.8	125.6-130.0	24.6
24.0- 29.2	76.3	171.5-173.2	45.4		
29.2- 29.9	60.4	173.2-175.0	126.5		
29.9- 30.1	103.2	175.0-179.2	225.4		
30.1- 37.2	75.0	179.2-180.0	79.2		
37.2- 39.2	33.2				
39.2- 45.2	29.9	Station 2.8			
45.2- 49.2	38.2	November 12, 1957			
49.2- 50.0	53.2	0 - 6.3	3.4		
50.0- 54.5	89.9	6.3- 7.1	15.7		
54.5- 55.3	78.2	7.1- 10.0	27.4		
55.3- 57.5	94.2	10.0- 10.8	28.2		
57.5- 58.3	103.2	10.8- 11.2	53.2		
58.3- 60.5	39.6	11.2- 15.5	14.8		
60.5- 61.9	46.0	15.5- 18.0	13.2		
61.9- 74.5	29.4	18.0- 19.6	9.5		
74.5- 75.0	43.2	19.6- 26.2	10.0		
75.0- 79.5	69.9	26.2- 30.5	6.7		
79.5- 80.5	43.2	30.5- 32.8	11.9		
80.5- 81.5	33.2	32.8- 43.4	72.1		
81.5- 81.7	28.2	43.4- 46.1	81.0		
81.7- 90.0	30.9	46.1- 50.0	80.2		
90.0-100.2	63.0	50.0- 52.0	103.2		
100.2-102.5	73.8	52.0- 56.3	21.8		
102.5-104.1	29.2	56.3- 60.0	19.4		
104.1-106.2	47.1	60.0- 60.5	43.2		
106.2-108.0	93.2	60.5- 65.1	68.4		
108.0-115.0	89.9	65.1- 71.2	306.2		
115.0-116.7	39.5	71.2- 72.0	128.2		
116.7-120.0	43.6	72.0- 75.0	103.2		
120.0-122.4	37.5	75.0- 76.1	57.8		
122.4-125.2	39.9	76.1- 77.6	43.2		
125.2-129.0	67.4	77.6- 79.2	28.2		
129.0-130.6	29.2	79.2- 81.0	47.6		
130.6-134.1	32.8	81.0- 85.2	88.9		
134.1-136.5	79.2	85.2- 86.4	36.5		
136.5-138.5	24.2	86.4- 90.2	50.6		
138.5-142.2	36.6	90.2- 91.5	34.0		
142.2-149.1	56.4	91.5- 94.8	34.5		



STATION Ross Ice Shelf  
 Traverse Site 3.0  
 DATE 12 November 57  
 LOCATION 79°10'S  
 166°30'W  
 OBSERVER Boyd



## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd, Smith

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 3.2					
November 13, 1957					
0 - 4.5	3.4	40.4- 42.2	70.0		
4.5- 7.7	15.7	42.2- 45.5	45.6		
7.7- 10.1	36.5	45.5- 48.2	18.0		
10.1- 11.2	48.7	48.2- 59.2	23.2		
11.2- 15.1	28.9	59.2- 60.5	18.6		
15.1- 17.1	23.2	60.5- 66.0	14.1		
17.1- 24.5	22.1	66.0- 68.0	68.2		
24.5- 30.9	62.6	68.0- 75.0	88.6		
30.9- 36.0	97.4	75.0- 76.0	63.2		
36.0- 47.3	134.2	76.0- 84.0	40.7		
47.3- 50.5	28.2	84.0- 85.2	36.6		
50.5- 53.8	36.6	85.2- 91.1	35.4		
53.8- 55.9	98.6	91.1- 95.7	24.9		
55.9- 61.0	85.6	95.7-103.8	32.9		
61.0- 61.6	103.2	103.8-104.7	26.4		
61.6- 72.5	73.0	104.7-117.5	46.7		
72.5- 76.0	26.0	117.5-134.0	47.9		
76.0- 83.8	25.0	134.0-135.8	37.5		
83.8- 86.1	38.0	135.8-141.8	19.2		
86.1- 88.5	19.9	141.8-156.3	45.6		
88.5- 90.0	90.9	156.3-158.0	21.9		
90.0- 99.5	101.0	158.0-159.9	35.8		
99.5-108.8	28.9	159.9-164.1	30.9		
108.8-116.0	51.4	164.1-170.0	89.0		
116.0-117.0	44.2	170.0-176.5	96.5		
117.0-130.0	25.7	176.5-179.0	36.2		
130.0-130.7	32.8	179.0-183.0	26.7		
130.7-145.0	51.7	183.0-183.8	29.2		
145.0-147.9	169.7	183.8-186.5	56.1		
147.9-155.5	35.8	186.5-187.5	44.2		
155.5-158.8	28.4	187.5-200.0	168.2		
158.8-166.5	48.4				
166.5-190.5	61.7				
190.5-191.0	44.2				
191.0-197.5	28.8				
197.5-198.2	32.8				
198.2-200.0	70.8				

## Station 3.4

November 14, 1957

0 - 18.2	3.7
18.2- 25.5	23.8
25.5- 32.0	34.0
32.0- 34.0	53.2
34.0- 40.4	73.6

STATION Ross Ice Shelf  
 Traverse Site 4.0  
 DATE 15 November 57  
 LOCATION 79°09'S  
 168°35'W  
 OBSERVERS Boyd

RAM HARDNESS

Temperature, °C

80

60

40

20

STRATIGRAPHIC  
 PROFILE

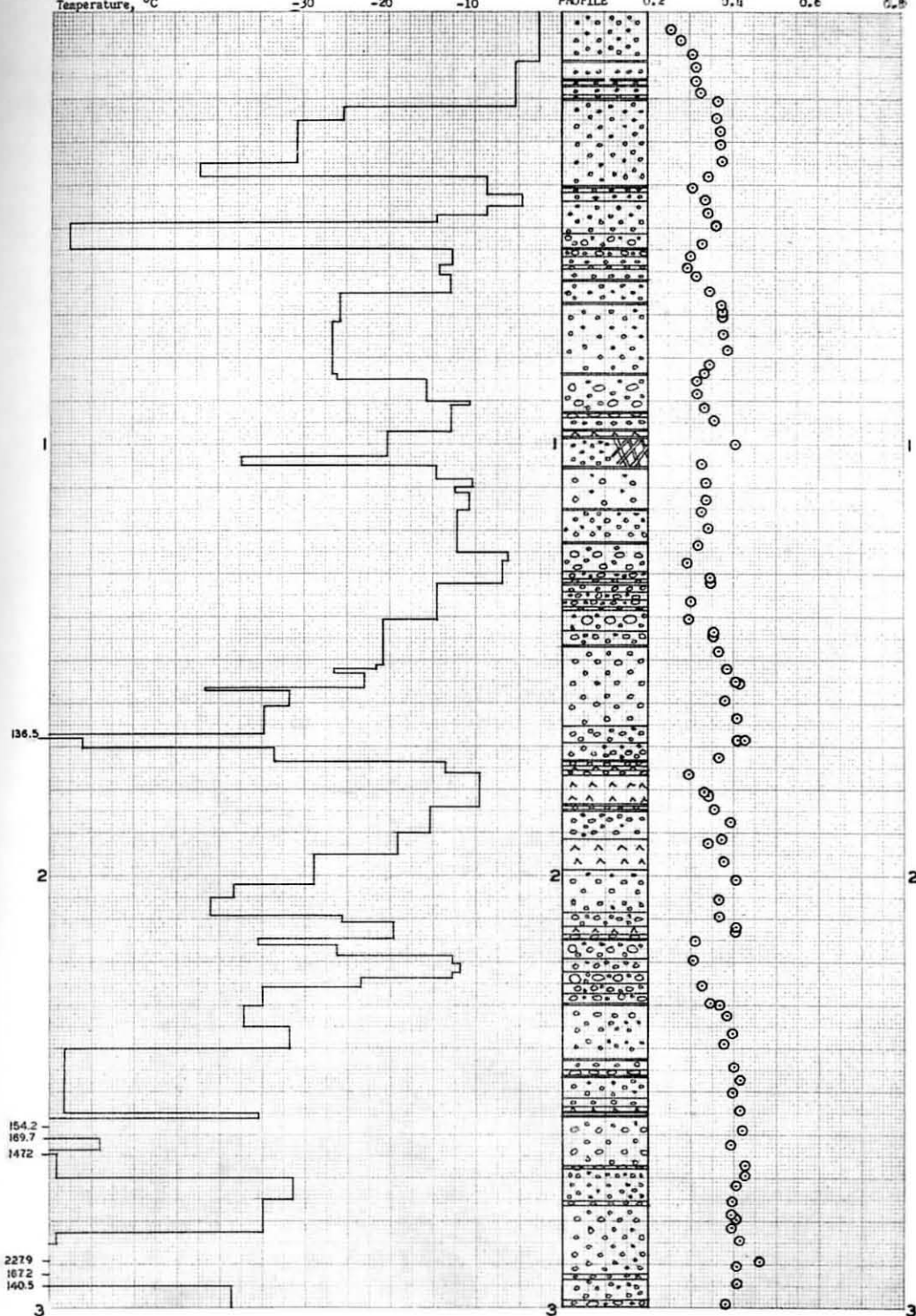
DENSITY

0.2

0.4

0.6

0.8



Ross Ice Shelf Traverse  
 Station Site 4.0  
 Date 15 November 1957  
 Observers Boyd, Cromie

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 11.1	.1-.2/.3	3:1	
11.1- 11.2			Crust
11.2- 15.7	.3-.5/.1-.6	2:1	
15.7			Crust splits into two
15.7- 16.8	.2-.1-.4/.6	4:1	
16.8			Crust
16.8- 19.2	.3-.5/.6-.1	2:1	
19.2- 19.7	.5/.6-.4	2:1	Crust
19.7- 19.8			Crust
19.8- 40.3	.2-.3/.4	2:1	Occasionally grains of .5
40.3- 40.5			Crusts
40.5- 41.8	.5-.6/.8-1.0	3:1	Loose platelets
41.8- 43.9	.3-.5/.7-.2	3:1	Needles and platelets
43.9- 51.3	.1-.2/.3-.5	2:1	
51.3- 54.7	.4-.5/.7	3:1	Occasionally grains of 1.0
54.7- 54.8			Crust
54.8- 56.6	1.0-1.2/1.5		
	.8-1.3	2:1	
56.6- 58.9	.3-.4/.1-.6	2:1	
58.9- 59.2	1.0-.8/1.2-.5	3:1	Air space
59.2- 67.1	.7-.5/1.0-.8	2:1	Crust at 62.2 and at bottom
67.1- 67.2			Crust
67.2- 83.7	.6-.5/.8		
	1.0-1.1	3:1	Crust at bottom
83.7- 92.5	1.0-.8/1.2-1.3	4:1	Very slight (crust)?
92.5- 92.6			Crust
92.6- 93.2	2.0-1.5-1.0/2.5	4:1	
93.2- 96.8	.8-1.0/.6-1.2	3:1	
96.8- 98.2	2.0-1.5/3.0	4:1	Cup shaped grain; crust at bottom and top
98.2-105.0	.6-.8/1.0-.9		Very hard packed
105.0-105.1			Crust
105.1-122.8	1.0-.8-1.2/1.4	3:1	Very slight crust at 115.2
122.8-122.9			Crust
122.9-129.5	1.2-.9-1.0/1.3	4:1	
129.5-131.1	1.2-1.1/1.4-1.5	2:1	
131.1-132.0	.8 to 1.0		Slightly cemented
132.0-132.5	Air space with 2.0-2.5		
132.5-134.1	.8-1.0/.5-1.2	4:1	
134.1-136.0	1.0-1.2/1.3-1.5	3:1	
136.0-137.8	1.0-1.3/1.5-2.2	4:1	Slightly cemented

Ross Ice Shelf Traverse  
 Station Site 4.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
137.8-138.2	.8-.6/Some 1.0		
138.2-143.2	1.5 to 3.0		Loose
143.2-146.5	.8-1.0/1.3	4:1	
146.5-146.6			Crust
146.6-165.3	1.1-.7-1.0/.5-1.2	3:2	
165.3-169.3	.7-.8/1.0	2:1	
169.3-173.4	1.0-1.2/.8-1.3	4:1	
173.4-173.5			Crust
173.5-174.2	1.0/.7		Slightly cemented
174.2-175.5	1.5-2.5/1.0	3:1	Cup shaped crystals
175.5-176.7	1.2-1.4/1.0-.8	2:1	
176.7-183.5	1.8 to 2.3/1.0	2:1	Cup shaped crystals
183.5-183.6			Crust
183.6-184.8	1.5 to 2.6		Crust at bottom
184.8-191.7	1.1-1.3/1.6-.8	2:1	
191.7-198.4	1.3 to 2.2		Cup shaped
198.4-208.5	.8-.7/1.0-.5	3:1	
208.5-211.7	1.8 to 3.0/1.2 to 1.5	3:1	Very loose and individual grains
211.7-213.4	1.0-1.2/1.5 to 2.3	3:1	More groups here
213.4-214.2	1.5 to 3.0		
214.2-214.8	.8-.6/1.0		Cemented bands
214.8-219.3	1.3-1.5/2.0-2.6	3:1	
219.3-222.2	1.0-1.2/1.6-1.8	3:1	Mostly groups
222.2-225.0	2.0 to 5.0		
225.0-227.7	.8-1.0/1.2	2:1	
227.7-229.9	1.5-1.8/2.0-2.3	3:1	Crust at bottom
229.9-230.0			Crust
230.0-242.7	1.0/1.1-0.8	2:1	Slight crust at bottom
242.7-251.3	.8-.6/1.0	2:1	245.2-245.5 band of 2.0 mm grains with crust
251.3-253.7	1.0/1.1-.7	3:1	
253.7-254.7	1.3 to 2.8		Cup shaped
254.7-254.8			Ice layer
254.8-255.4	.6-.9/1.0	4:1	Well cemented
255.4-255.7			Heavy ice layer
255.7-267.2	1.2-1.0/1.6		Occasionally grains 2.0
267.2-267.5	1.0 to 1.3		Band of enlarged grains
267.5-275.2	.8-.6/1.2 to 1.4	4:1	
275.2-276.1	1.2 to 1.7		
276.1-292.6	1.2/1.4-1.0	3:1	
292.6-293.7	1.3 to 1.8		
293.7-298.5	1.0/.8-1.3	2:1	
298.5-299.7	1.2 to 2.3		
299.7	1.1-.7/1.3	4:1	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf TraverseObservers Boyd, Cromie

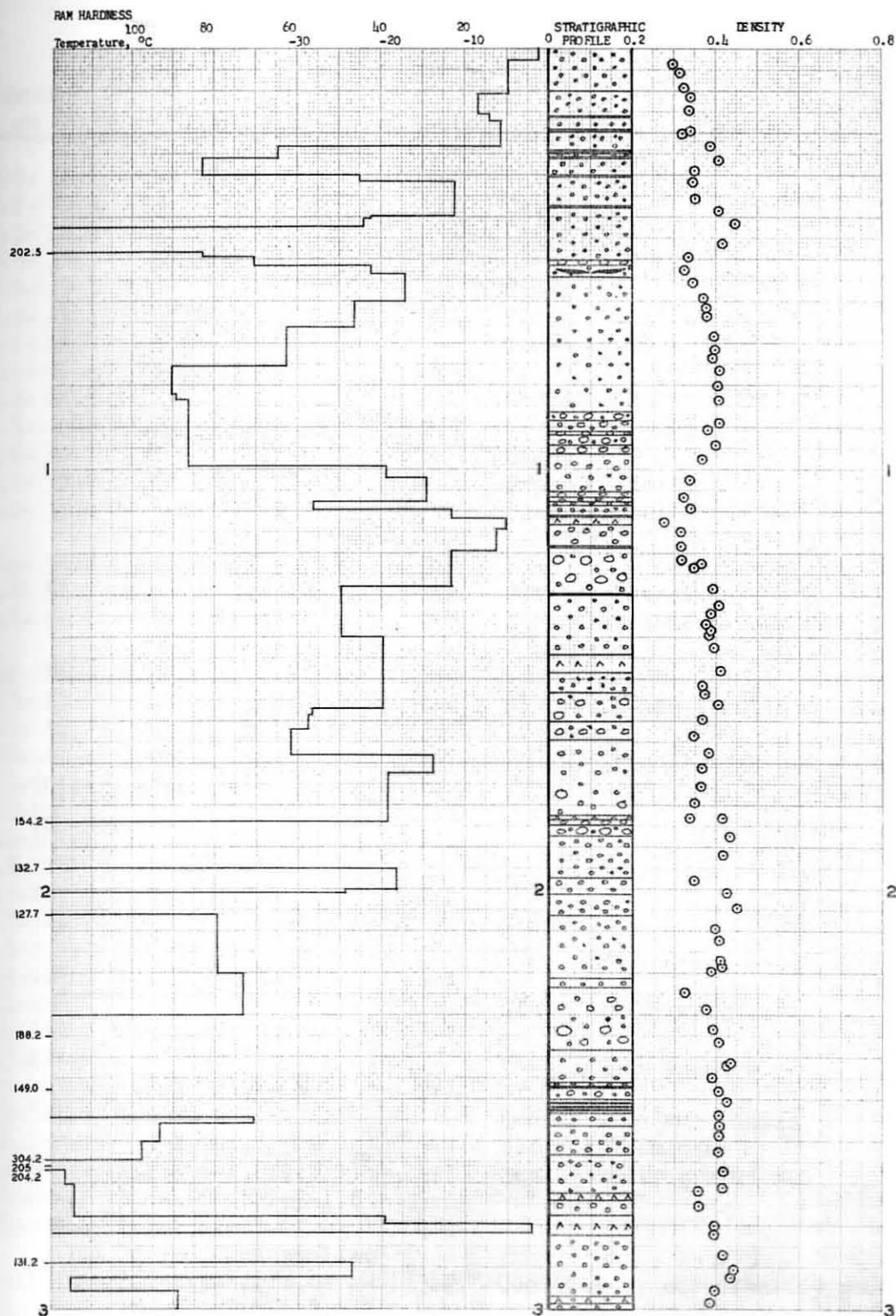
Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 4.3					
November 16, 1957					
0 - 8.8	3.3	36.3- 50.5	41.9		
8.8- 18.7	3.7	50.5- 62.5	51.5		
18.7- 27.1	10.9	62.5- 94.3	90.0		
27.1- 29.8	21.7	94.3- 95.2	92.1		
29.8- 33.3	37.5	95.2- 99.0	213.7		
33.3- 36.2	72.2				
36.2- 38.8	72.4				
38.8- 42.1	39.6				
42.1- 44.3	39.6				
44.3- 45.2	47.6				
45.2- 48.2	33.2				
48.2- 49.1	47.6				
49.1- 51.0	45.3				
51.0- 54.9	31.4				
54.9- 60.1	45.5				
60.1- 64.8	60.6				
64.8- 66.5	38.5				
66.5- 72.5	18.2				
72.5- 80.4	58.9				
80.4- 85.1	35.1				
85.1- 88.2	22.6				
88.2- 91.8	25.4				
91.8- 95.2	39.5				
95.2- 99.1	50.3				
99.1-100.2	40.6				
100.2-105.2	28.2				
105.2-108.5	31.5				
108.5-112.0	41.3				
112.0-113.1	113.2				
113.1-115.1	84.2				
115.1-117.8	33.8				
117.8-120.0	63.3				

## Station 4.5

November 17, 1957

0 - 4.9	3.4
4.9- 7.7	10.3
7.7- 10.1	19.8
10.1- 14.9	47.0
14.9- 20.1	78.2
20.1- 22.4	90.2
22.4- 23.0	86.6
23.0- 30.5	83.2
30.5- 34.2	35.6
34.2- 36.3	60.4

STATION Ross Ice Shelf  
 Traverse Site 5.0  
 DATE 17 November 57  
 LOCATION 75°07'S  
 171°30'W  
 OBSERVERS Boyd





Ross Ice Shelf Traverse  
 Station Site 5.0  
 Date 17 November 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 10.2	.1>.1/.2	3:1	
10.2- 16.3	.2=.1/.3>.1	4:1	Crust
16.3- 16.4			Crust
16.4- 19.2	.3=.2/.4 to .5		
19.2- 19.3			Crust
19.3- 24.1	.3/.5=.2	3:1	Slight crust at 24.1
24.1- 24.4	.5 to .7		Crust at 24.4
24.4- 25.4	.1=.2/.5 to .7	2:1	
25.4- 25.5			Crust
25.5- 30.0	.2=.3=.5/.1=.6	2:1	
30.0- 30.1			Crust
30.1- 37.2	.2=.4/.6	2:1	Crust at bottom
37.2- 37.4	.5 to .7/.2	3:1	Progressively less well cemented to bottom
37.4- 50.8	.1=.2=.3/.5=.7	3:1	
50.8- 51.7	1.0-1.2-1.3/1.5	2:1	With air space
51.7- 54.2	.7=.9/1.0-1.1	2:1	Irregular shaped lens and slightly cemented
54.2- 86.3	1.0=.8/1.2=.5	3:1	
86.3- 88.1	1.0=.7-1.2/.5-1.4	4:1	91.0-91.2 has 1.0-1.5 mm grains
88.1- 94.2	.6=.8/1.0-1.1	3:1	
94.2- 96.1	1.0-1.2/1.3	4:1	
96.1-105.7	.8-1.1/1.5	6:1	
105.7-106.4	.5=.4=.7/1.0	2:1	Cemented
106.4-107.8	1.3-1.6/1.0-1.2	4:1	
107.8-108.5	.8=.6/.3=.5	3:1	Occasionally grains 1.0
108.5-111.0	1.0=.8/1.3	2:1	
111.0-111.1			Crust
111.1-113.2	2.0 to 6.0		Cup shaped
113.2-118.4	1.1-1.3/1.4-1.7	4:1	
118.4-118.6			Crust; very irregular
118.6-129.7	1.4-1.7/2.0-2.4	3:1	
129.7-129.9			Faint crust remnant
129.9-144.2	.7-1.0/1.2=.5	3:1	
144.2-148.6	1.6 to 2.4		Loose; some cup shaped
148.6-153.2	.8-1.3-1.1/1.5	5:1	Slightly cemented
153.2-160.4	1.3-1.6-1.0/1.7	4:1	Occasionally grains 2.0
160.4-164.7	1.3-1.0=.8/1.5-1.8	5:1	
164.7-182.4	1.2-2.1/occ. 1.0 and smaller	4:1	
182.4-183.4	1.0-1.3-1.6/2.0	3:2	Cup shaped; occasionally grains 2.5
183.4-184.8	1.0-1.3-1.6/1.8-2.3	4:1	
184.8-187.1	1.4 to 2.7		

Ross Ice Shelf Traverse  
Site 5.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
187.1-197.3	.7-.6-.8/1.0-1.3	3:1	Occasionally grains 1.8
197.3-201.2	1.2-1.0/1.5-1.7	3:2	
201.2-206.2	.7-.8/1.0	3:1	Cemented
206.2-221.2	1.2-1.4/1.0-1.5-.8	3:1	
221.2-223.6	1.3-1.5/1.0 occ. .8	2:1	
223.6-233.8	1.3-1.7/2.0 occ. 1.0	2:1	Occasionally slightly larger than 2.0
233.8-246.0	.7-.6/1.3-1.2-1.0	4:1	
246.0-246.4	1.3-1.8		
246.4-247.5			Cemented band of .8 to 1.3
247.5-250.3	1.2-.7-1.3/1.6	2:1	
250.3-253.8			Three ice layers with cemented 1 mm grains
253.8-256.2	.6-.7-1.0/1.3	2:1	
256.2-263.5	1.0-1.3-1.5/.8 occ. 1.6-1.8	3:1	
263.5-272.4	.7-1.0/occ. 1.1-1.3	2:1	
272.4-274.1	1.3 to 2.1		Cup shaped
274.1-277.9	1.0-1.5/1.3-1.6	4:1	
277.9-282.4	1.7-2.8		Cup shaped
282.4-297.0	.6-.9/1.0-1.3	4:1	
297.0-298.6	1.2-2.3		Mostly cups; granules
298.6-300.0	1.2-1.0-1.6/1.3	2:1	

## RAM HARDNESS DATA SHEET

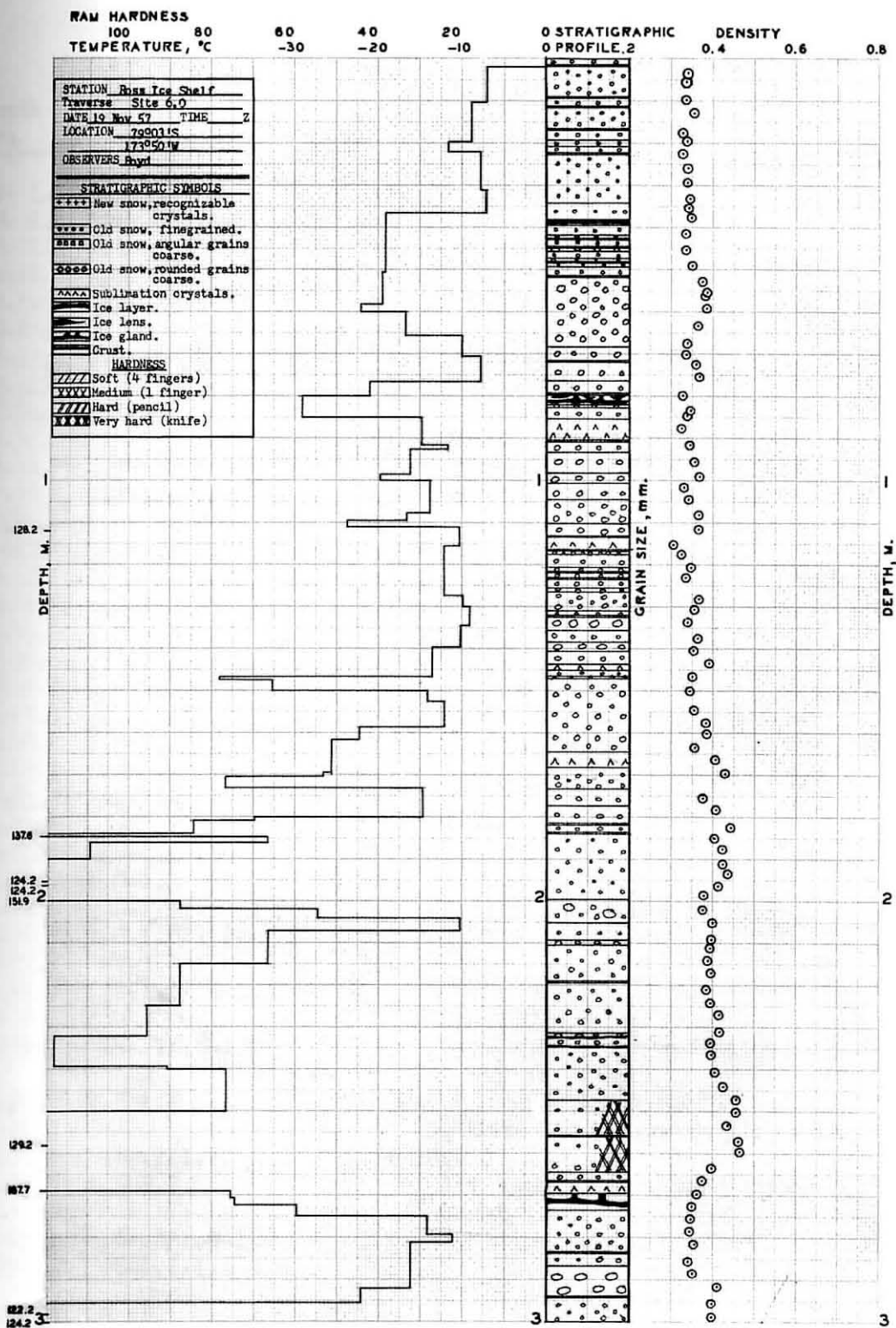
 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 5.2		19.7- 21.5	36.5		
November 18, 1957		21.5- 28.6	31.4		
0 - 6.0	3.4	28.6- 30.5	24.3		
6.0- 10.2	29.4	30.5- 36.0	21.4		
10.2- 20.1	45.6	36.0- 45.0	60.0		
20.1- 25.0	58.3	45.0- 50.1	89.4		
25.0- 34.0	56.6	50.1- 54.2	64.2		
34.0- 36.2	39.6	54.2- 56.5	46.7		
36.2- 40.0	16.4	56.5- 68.9	46.8		
40.0- 41.2	28.2	68.9- 77.9	78.5		
41.2- 44.0	24.6	77.9- 87.8	63.5		
44.0- 46.7	25.4	87.8- 90.5	40.2		
46.7- 53.5	41.5	90.5- 97.0	38.6		
53.5- 55.0	216.3	97.0-103.0	44.2		
55.0- 59.3	317.2	103.0-110.1	67.6		
59.3- 65.3	83.2	110.1-117.3	43.1		
65.3- 66.8	56.6	117.3-121.2	24.7		
66.8- 78.2	37.4	121.2-125.0	27.9		
78.2- 79.8	40.7	125.0-126.0	64.2		
79.8- 85.0	45.5	126.0-130.1	82.3		
85.0- 98.5	50.9	130.1-140.2	90.3		
98.5-105.0	47.3	140.2-150.1	117.4		
105.0-108.2	129.2	150.1-155.0	116.5		
108.2-114.7	111.7	155.0-163.0	116.7		
114.7-117.0	47.7	163.0-185.0	80.6		
117.0-121.5	30.9	185.0-190.0	112.2		
121.5-125.3	30.5	190.0-195.1	157.2		
125.3-134.2	37.9	195.1-199.8	182.8		
134.2-136.2	34.2				
136.2-137.0	79.2				
137.0-138.0	154.2				
138.0-140.2	204.2				
140.2-144.5	120.5				
144.5-146.8	47.7				
146.8-151.6	41.7				
151.6-159.3	43.2				
159.3-165.5	68.8				
165.5-168.0	100.2				
168.0-170.1	118.4				

## Station 5.3

November 19, 1957

0 - 4.0	3.5
4.0- 6.5	23.2
6.5- 7.5	53.2
7.5- 10.2	62.4
10.2- 19.7	63.2



Ross Ice Shelf Traverse  
 Station Site 6.0  
 Date 19 November 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0-1.5	.1/.1-.2	3:1	Crust at 1.5
1.5-9.0	.2-.3/.1-.5	2:1	Crust .05
9.0-11.1	.3-.5/.1	2:1	.05 crust at 9.0
11.1-16.7	.3-.5/.1-.6	3:1	Crust at 11.1
16.7-19.2	.5/.2-.1-.3	4:1	Crust at 16.7
19.2-20.6	.1-.2-.5/.7	4:1	
20.6-22.2	.5/.6-.2	2:1	Crust at bottom .05
22.2-34.3	.2-.4-.5/.1	2:1	
34.3-38.1	.1-.3/.5	3:1	
38.1-38.2			Crust
38.2-38.7	.5-.6/.3 occ. .1		Slight air space
38.7-39.6	.3-.1>.1/.4	4:1	Crust at bottom
39.6-41.9	.1-.3/.5	4:1	
41.9-42.3	.3/.1-.5	2:1	Extremely thin crust
42.3-42.8	.5-.7/.3-.2	4:1	
42.8-44.5	.7-1.0/.5-.3	2:1	
44.5-44.6			Crust
44.6-45.5	.6-.8/.3-.5	2:1	
45.5-45.8	1.0-1.2/.5-.8	3:1	Air space
45.8-47.3	.7-.8-1.0/.5	2:1	Slightly cemented; irregular
47.3-48.0	1.0-1.1/.7	2:1	Crust at 48.0; very slightly cemented
48.0-49.1	.8-1.1/.7-.5	2:1	
49.1-51.3	1.1-1.2/.8-1.0	3:1	
51.3-51.4			Crust
51.4-68.2	1.0-1.2/.7-1.0	2:1	
68.2-68.4	1.0-1.3		
68.4-71.5	.9-1.3/.5-.7	2:1	Very slight crust at 71.5
71.5-76.3	1.2-1.0/1.4-.7	2:1	
76.3-77.1	.7-1.0/1.2-.5	3:2	
77.1-79.2	.7-1.0/.5-1.2	3:1	
79.2-79.3			Crust
79.3-79.7	.5-.7/.8-1.0	4:1	Varies in width and slight crust at bottom
79.7-82.0	1.3-1.7		
82.0-82.3			Glands and lenses varying in width
82.3-85.4	.6-.9/1.1	2:1	
85.4-90.5	1.5-2.3		Air space; cup shaped crystals
90.5-90.6			Crust
90.6-93.1	.6-.8/1.0-1.2	3:1	
93.1-97.7	.8-1.2/1.2-1.6	3:1	

Ross Ice Shelf Traverse  
 Station Site 6.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
97.7-100.5	.6-1.0/1.2-1.3	4:1	
100.5-104.5	1.1-.7/1.3-1.7	5:1	
104.5-110.1	.7-1.0/1.2-.8-1.4	3:1	Well cemented
110.1-113.1	.6-.8/1.0	3:1	Well cemented; very slight crust at bottom
113.1-116.5	1.4-2.3		Very loose; cup shaped
116.5-116.6			Crust
116.6-117.4	1.2-1.8		Very loose; few cup shaped crystals
117.4-120.5	1.0-1.5		Loose
120.5-121.6	.7-1.0/1.2-1.4	4:1	
121.6-123.0	1.1-1.3/1.5-1.8	3:1	Crust at 121.6
123.0-125.5	1.2-1.7		Loose; crust at bottom
125.5-126.3	.7-1.0/1.3	2:1	
126.3-131.0	1.1 to 1.7		Very loose
131.0-132.0	.8 to 1.2		
132.0-132.3	.8-1.0		Crust small cemented grains
132.3-135.7	1.2-2.4		Very loose
135.7-138.7	.7-1.0/1.1-.6	2:1	
138.7-140.5	1.3-2.1		Loose
140.5-143.6	.7-.9/1.1-1.3	3:1	
143.6-145.0	1.4 to 2.6		Air space
145.0-146.7	.6-.7/1.0	2:1	Well cemented
146.7-146.8	1.3-1.5/2.0-2.2	3:1	Some cupped shaped crystals
146.8-164.7	1.0-.7/1.3-1.7	3:1	
164.7-168.0	1.6-2.7		Slight air space; large cups
168.0-173.2	.6-.8-1.0/1.2-1.4	5:1	
173.2-177.2	1.2-1.7		
177.2-181.5	1.0-.7-.5/1.1-1.3	5:1	
181.5-183.8	1.3-2.7		Very loose
183.8-199.5	1.0-1.2/1.3-.7	2:1	
199.5-205.1	1.2-1.5/1.0-1.6	3:1	
205.1-209.4	1.0-.7-.8/1.1-1.3	2:1	
209.4-210.2	1.1-1.2/.8-1.0	2:1	
210.2-219.6	1.0-1.2-1.4/1.6-1.8	3:1	
219.6-219.7			Crust
219.7-231.3	.7-1.0/1.1 occ. 1.2	3:1	
231.3-232.1	1.4-2.1		Loose
232.1-232.4			Irregular ice layer; may vary in depth
232.4-234.7	.8 to 1.3		Cemented; ice layer at bottom varying in width
234.7-247.3	1.0-1.3/.7-.9	2:1	
247.3-255.7	.6-.8/1.0	2:1	Very hard packed
255.7-255.8	1.1-1.4		Thin layer
255.8-264.7	1.1-.8-.6/1.3	4:1	
264.7-266.4	1.3-2.2		

Ross Ice Shelf Traverse  
 Station Site 6.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
266.4-266.5			Crust
266.5-267.0	1.0-.8		Well cemented
267.0-269.5	1.7-2.8		Loose cup crystals
269.5-273.4	2.0-3.0		Ice glands and enlarged grains; very irregular in depth
273.4-283.1	1.3-2.1		Mostly individual
283.1-283.2			Crust
283.2-286.9	1.0-1.2/1.4-1.6	2:1	
286.9-294.2	2.0-3.1		Very loose
294.2-294.3			Crust
294.3-300.0	1.0-.7/.5-1.5-1.3	4:1	Slightly cemented

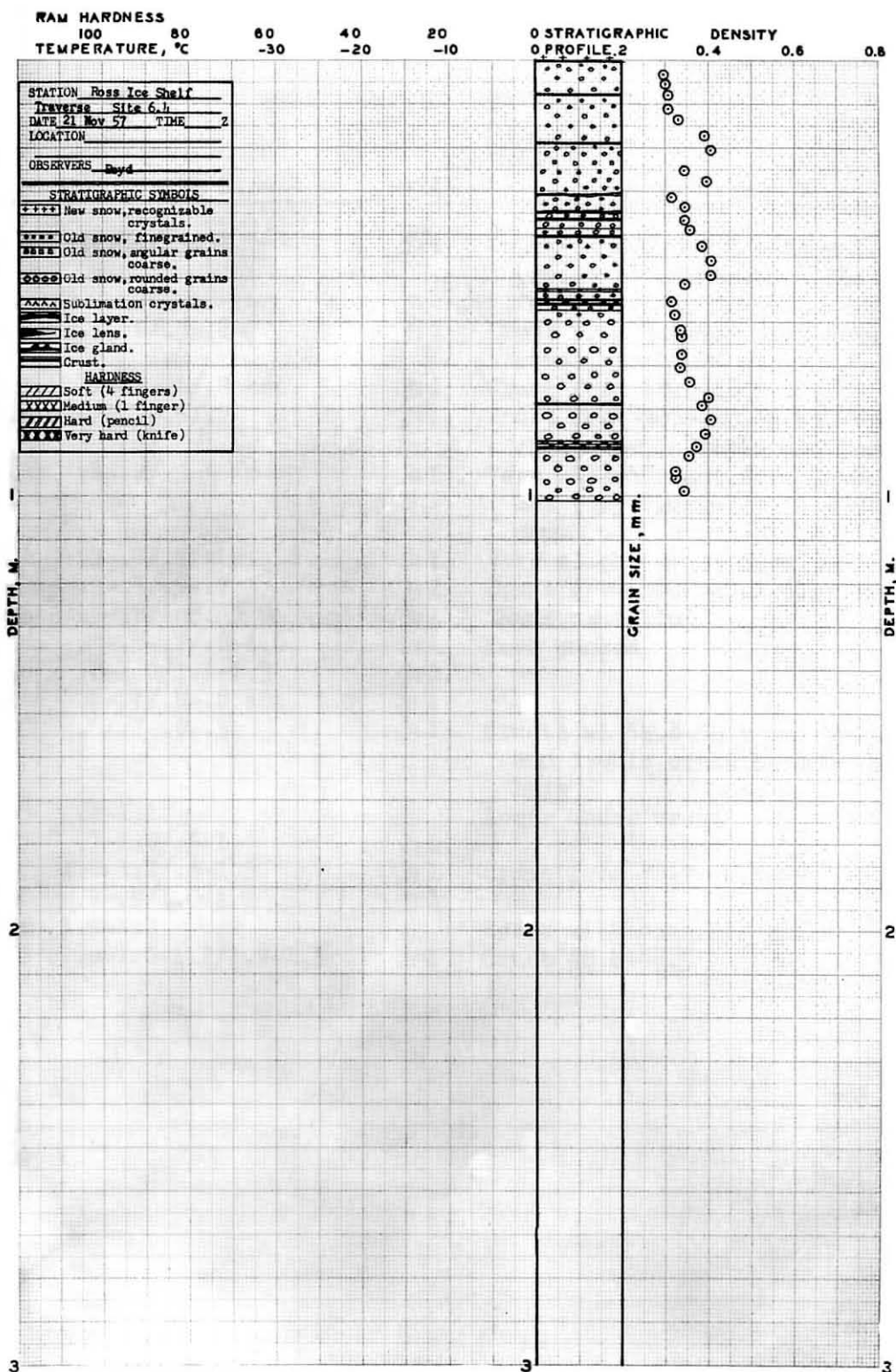


RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse

Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 6.2					
November 21, 1957					
0 - 5.3	3.4				
5.3- 8.7	9.1				
8.7- 13.6	13.4				
13.6- 15.7	22.3				
15.7- 20.5	11.5				
20.5- 25.1	20.6				
25.1- 28.5	32.6				
28.5- 30.5	23.2				
30.5- 35.0	36.6				
35.0- 39.6	38.0				
39.6- 41.2	28.2				
41.2- 55.1	32.0				
55.1- 65.3	40.4				
65.3- 70.3	55.2				
70.3- 76.2	43.9				
76.2- 79.1	30.8				
79.1- 81.3	39.6				
81.3- 88.7	35.6				
88.7- 89.9	36.5				
89.9- 95.3	23.6				
95.3- 97.4	28.6				
97.4-101.1	25.8				
101.1-105.1	14.2				
105.1-113.0	32.0				
113.0-119.0	64.2				
119.0-130.0	39.6				
130.0-135.0	52.2				
135.0-143.2	92.0				
143.2-149.1	105.8				
149.1-151.0	56.8				
151.0-159.1	41.2				
159.1-173.2	179.8				
173.2-178.5	60.8				
178.5-184.5	87.6				
184.5-186.1	66.6				
186.1-192.5	35.4				
192.5-196.2	39.3				
196.2-199.8	43.1				
199.8-200.0	29.2				



Ross Ice Shelf Traverse  
 Station Site 6.4  
 Date 21 November 1957  
 Observer Boyd

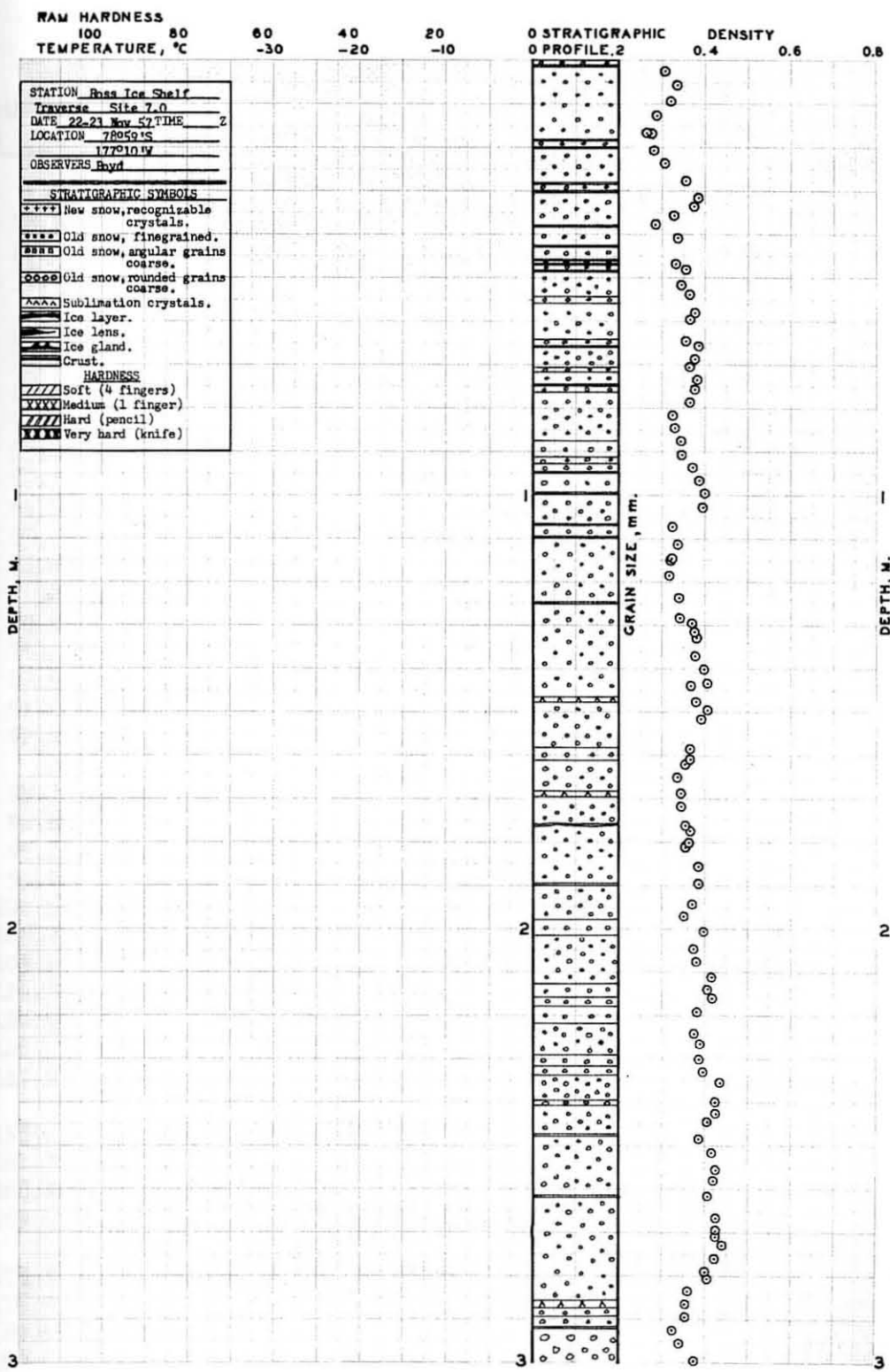
# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 7.8	.2-.1/.3-.5	2:1	Crust from 0.0-0.1 with a few grains of new snow on the surface
7.8- 18.8	.1-.2/.3>.1	3:1	Crust from 7.8-7.9 (ice-like crust)
18.8- 30.5	.1-.2>.1/.3 occ. 5	3:1	Crust from 18.8-18.9
30.5- 34.6	.2-.3-.5/.7	2:1	Crust from 30.5-30.6, but very irregular in depth and form
34.6- 36.1	.1-.2/.3	3:2	Very slight crust from 34.6-34.7, but very irregular in width and depth
36.1- 38.4	.3-.5/.7 occ. .8	2:1	Very slight crust from 36.1-36.2
38.4- 40.0	.2-.5/.5-.7	3:2	Crust from 40.0-40.1 (ice crust)
40.0- 40.6	.5-.8/occ. 1.0	3:1	Shows cementing
40.6- 52.5	.3-.5-.7/.8-1.0	2:1	Hard packed
52.5- 53.0	.8-1.0/1.1-1.3	3:1	
53.0- 54.8	.6-.7/.5-.8 occ. 1.0	4:1	
54.8- 55.3	.6/.7-.9-.5	3:1	Crusts at 54.8-54.9 and 55.3-55.4 and double crust becomes one here
55.3- 55.5	.7-1.1		Loose under crust
55.5- 57.1	.7-1.0/.5-1.1	2:1	
57.1- 78.7	1.0-1.1/.8-1.3	3:1	Crust from 78.7-78.8
78.7- 87.6	.7-.9/1.0-1.2	3:1	
87.6- 87.9	1.0-1.3		Loose with some air space
87.9-101.0	.8-1.0-1.2/1.2-1.5	3:1	Crust 88.4-88.5

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 6.6					
November 21, 1957					
0 - 4.1	3.4				
4.1- 10.1	18.2				
10.1- 15.2	22.8				
15.2- 17.3	27.0				
17.3- 20.5	28.2				
20.5- 23.8	33.5				
23.8- 27.5	30.2				
27.5- 29.7	21.4				
29.7- 32.0	39.6				
32.0- 34.3	55.4				
34.3- 36.0	38.5				
36.0- 41.5	16.0				
41.5- 47.3	18.7				
47.3- 49.6	24.9				
49.6- 51.1	136.6				
51.1- 53.7	118.6				
53.7- 59.5	34.2				
59.5- 65.6	32.7				
65.6- 69.5	54.5				
69.5- 77.2	62.9				
77.2- 85.0	91.6				
85.0- 90.1	50.3				
90.1- 93.1	29.9				
93.1- 96.3	29.2				
96.3- 98.2	30.5				
98.2-101.7	32.8				
101.7-105.0	76.9				
105.0-108.0	64.2				
108.0-110.6	46.5				
110.6-121.0	37.9				
121.0-130.0	66.6				
130.0-133.1	33.2				
133.1-135.9	25.6				
135.9-141.3	33.8				
141.3-150.0	54.8				



Ross Ice Shelf Traverse  
 Station Site 7.0  
 Date 22-23 November 1957  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.1	.2-.3/.1	3:2	Crust from 1.1-1.2
1.1- 28.8	.3-.1-.2/>.1	4:1	
28.8- 29.9	.3-.2/.5 occ. .7	2:1	Crust from 28.2-28.3
29.9- 38.0	.1-.2/.3 very occ. .5	3:1	Crust from 29.9-30.0
38.0- 42.6	.5-.3/.5-.7	2:1	Crust from 38.0-38.1
42.6- 46.7	.2-.1/.3-.5	2:1	Crust from 42.6-42.7
46.7- 48.1	.7-.5/.8-1.0	3:1	Crust 46.0, 45.8
48.1- 54.3	.6-.8/1.0	2:1	Crust at 46.7 and from 48.1-48.2
54.3- 55.7	.7-1.2		Loose
55.7- 64.1	.7-1.0/1.2	4:1	
64.1- 65.6	.8-1.2		Loose grains
65.6- 65.7			Crust
65.7- 70.8	1.0/.5-.7	4:1	
70.8- 71.2	1.0-1.3		Loose grains
71.2- 74.6	1.1-1.5		Loose
74.6- 76.1	.3-.5/.6-.8	2:1	Crust at bottom
76.1- 87.6	.7-1.0-1.1/1.1-1.3	3:1	
87.6- 91.2	.7-.8-.5-1.0/1.1-1.3	3:2	
91.2- 92.4	1.1-1.5		Air spaces; occasionally grains to 2.0 mm
92.4- 94.7	.5-.7/.8-1.0	5:1	
94.7- 94.8			Ice crust
94.8- 99.1	.7-1.0-1.1/.5-.7	4:1	
99.1- 99.2			Crust
99.2-106.6	1.1-1.3/.7-1.0	3:1	
106.6-106.7			Crust
106.7-109.4	1.0-1.3/1.5-1.8	2:1	Crust at 109.4-109.5
109.4-124.8	1.1-1.3/.7-1.0	3:1	
124.8-124.9			Crust
124.9-146.3	.8-1.0/.6-.7-1.1-1.3	3:1	
146.3-147.5	1.6-2.8		Air space; loose packed grains and some cupped
147.5-158.1	.6-.8/1.0-1.3	4:1	
158.1-161.0	1.0-1.3/.7-1.5	4:1	
161.0-168.3	1.1-1.4/.8-1.0	5:1	
168.3-169.4	1.8-2.5		Loose grains with air spaces and some are cupped
169.4-175.3	.7-.8-1.0/1.1-1.3	2:1	
175.3-175.5			Crust; irregular in depth
175.5-189.6	1.0-1.2-.7/1.3-1.5	4:1	
189.6-189.8			Crust

Ross Ice Shelf Traverse  
 Station Site 7.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
189.8-197.8	.6-.8-1.0/1.1-1.3	3:1	
197.8-202.3	.5-.7/.8-1.0	2:1	
202.3-212.5	1.1-1.3/1.5-1.8	3:1	
212.5-215.6	.8-1.1/1.3-1.5	2:1	
215.6-217.7	1.5-1.8/1.0-1.3	2:1	
217.7-221.8	.6-.7-.8/1.0	3:1	
221.8-229.1	1.0-1.3/1.5-.7	3:1	
229.1-231.7	.7-1.0/1.1-1.2	3:1	
231.7-233.7	1.1-1.5/.7-1.0	3:1	
233.7-239.5	.6-.8/1.0	3:1	
239.5-240.7	.8-1.0/1.2-1.3	2:1	
240.7-247.2	.5-.7-.8/1.0	2:1	Crust from 247.1-247.2
247.2-247.9	1.0-1.3		Very loose
247.9-261.3	1.1-1.5/.7-1.8 occ. 2.0	3:1	Crust from 261.3-261.4
261.3-261.4	.7-1.0/.5 occ. 1.1	3:1	
261.4-285.7	1.5-2.3/1.0-1.3	3:1	Very loose and cup shaped
285.7-287.1	.6-.8/1.0-1.2	4:1	
287.1-289.4	1.5-1.8/.8-1.2	3:1	
289.4-291.5			Crust
291.5-291.6	1.0-1.3/.7-1.0	4:1	



## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf TraverseObservers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 7.2		156.1-165.2	66.8	149.7-168.7	119.7
November 23, 1957		165.2-166.1	59.8	168.7-170.8	42.3
0 - 3.1	3.5	166.1-173.2	74.6	170.8-174.0	51.1
3.1- 5.1	18.2	173.2-175.0	115.4	174.0-175.2	70.8
5.1- 10.1	35.2	175.0-184.1	130.7	175.2-186.5	68.0
10.1- 11.5	31.8	184.1-189.1	164.2	186.5-187.9	47.0
11.5- 14.5	16.5	189.1-199.7	84.4	187.9-197.2	36.5
14.5- 18.1	28.2			197.2-200.0	54.2
18.1- 19.2	12.3	Station 7.4		Station 7.6	
19.2- 21.2	5.7	November 23, 1957		November 23, 1957	
21.2- 28.3	3.9	0 - 4.1	3.4	0 - 3.2	3.5
28.3- 30.0	27.0	4.1- 13.2	29.6	3.2- 10.3	27.1
30.0- 34.0	47.2	13.2- 16.1	30.8	10.3- 18.1	26.3
34.0- 35.6	15.7	16.1- 17.7	28.2	18.1- 20.1	13.2
35.6- 37.2	36.6	17.7- 20.3	26.3	20.1- 21.9	19.9
37.2- 42.0	18.8	20.3- 23.1	10.3	21.9- 26.2	21.8
42.0- 45.3	30.4	23.1- 29.6	41.7	26.2- 35.3	40.6
45.3- 48.5	50.1	29.6- 31.0	13.9	35.3- 37.2	82.2
48.5- 60.3	88.0	31.0- 37.7	18.1	37.2- 41.2	65.7
60.3- 65.0	77.6	37.7- 39.0	30.1	41.2- 45.7	14.3
65.0- 69.3	96.2	39.0- 52.1	42.9	45.7- 51.4	8.5
69.3- 71.5	48.7	52.1- 53.1	43.2	51.4- 54.0	37.8
71.5- 78.2	33.6	53.1- 59.4	33.4	54.0- 67.0	58.4
78.2- 80.3	31.8	59.4- 71.3	63.8	67.0- 83.1	154.0
80.3- 82.1	140.7	71.3- 75.1	34.8	83.1- 84.9	25.4
82.1- 83.3	136.4	75.1- 78.7	19.9	84.9- 87.0	36.6
83.3- 85.1	25.4	78.7- 80.3	15.7	87.0- 90.1	80.6
85.1- 89.7	40.2	80.3- 85.1	20.9	90.1- 98.9	57.8
89.7- 91.0	19.6	85.1- 90.0	11.4	98.9-102.2	58.8
91.0- 99.5	39.5	90.0- 90.5	23.2	102.2-107.2	52.2
99.5-101.6	51.8	90.5- 95.1	35.8	107.2-113.1	70.3
101.6-104.0	104.2	95.1- 96.1	64.2	113.1-115.3	94.3
104.0-108.5	93.2	96.1-102.7	64.8	115.3-118.5	82.4
108.5-111.0	8.2	102.7-105.0	108.2	118.5-120.2	63.0
111.0-113.0	19.2	105.0-108.9	96.6	120.2-128.1	29.5
113.0-114.0	29.2	108.9-119.7	110.7	128.1-129.7	16.7
114.0-120.0	50.9	119.7-122.5	111.3	129.7-130.9	54.2
120.0-125.5	80.6	122.5-123.6	95.2	130.9-138.5	46.3
125.5-127.5	164.2	123.6-124.8	37.5	138.5-140.0	44.2
127.5-128.8	65.8	124.8-128.7	24.7	140.0-150.2	45.4
128.8-132.1	34.8	128.7-132.5	17.4	150.2-151.5	27.3
132.1-134.2	23.3	132.5-133.6	22.4	151.5-157.1	34.6
134.2-136.0	54.2	133.6-137.0	20.4	157.1-158.1	84.2
136.0-138.0	154.2	137.0-139.0	69.2	158.1-160.7	81.2
138.0-140.9	159.2	139.0-144.7	49.8	160.7-162.1	32.8
140.9-145.3	86.1	144.7-145.7	44.2	162.1-172.1	44.2
145.3-156.1	61.6	145.7-149.7	49.2	172.1-180.2	63.4

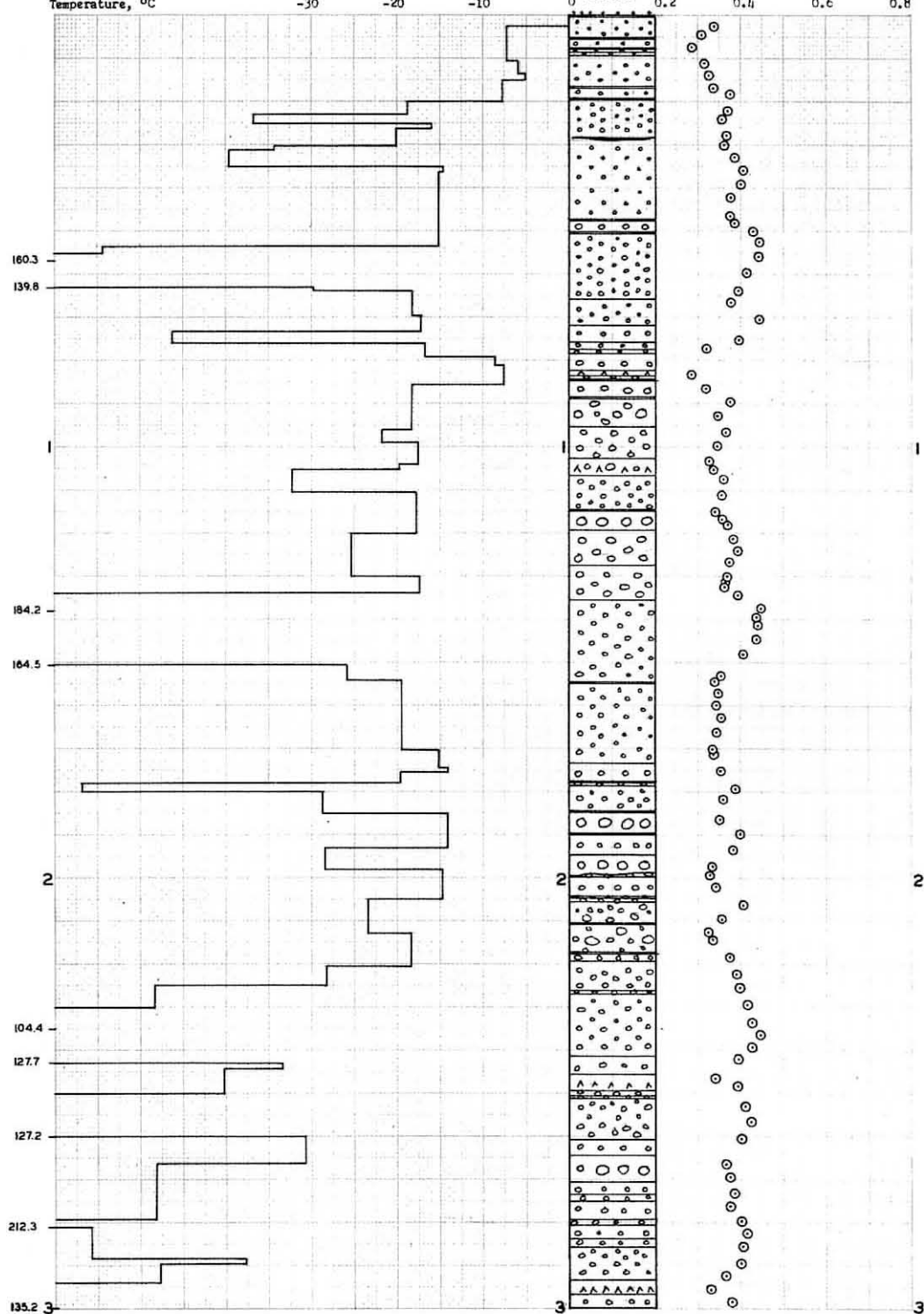
STATION Ross Ice Shelf  
 Traverse Site 8.0  
 DATE 24 November 57  
 LOCATION 79°04'S  
 179°05'E  
 OBSERVER Boyd

RAM HARDNESS

Temperature, °C 100 80 60 40 20 -10

STRATIGRAPHIC  
 PROFILE

DENSITY



Ross Ice Shelf Traverse  
 Station Site 8.0  
 Date 24 November 1957  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.1	1.0-1.2		New fallen snow; crystal plates
0.1- 5.1	.1-.2/.3>.1	3:1	Crust .1-.2
5.1- 5.2			Crust; top very irregular surface
5.2- 7.6	.3-.5/.2-.6	2:1	Very slight crust at 7.6
7.6- 8.5	.2-.3/.1-.5	3:1	
8.5- 9.1	.1-.2/.3	2:1	
9.1- 16.3	.1-.3/.5-.7	3:1	Very slight crust at bottom
16.3- 19.1	.5/.2-.3	2:1	
19.1- 19.2			Crust
19.2- 28.2	.1-.2/.3>.1	2:1	
28.2- 29.0	.7-1.0		Alternating ice lens, maybe double crust in some places
29.0- 47.2	1.0-1.1/.5-.7	3:1	
47.2- 47.3			Crust
47.3- 47.6	1.2-1.7		Loose grains
47.6- 50.2	1.0-1.3/1.5-.7-.9	3:1	
50.2- 50.3			Crust
50.3- 65.9	.3-.5-.7/1.0	3:1	
65.9- 71.8	1.0-1.1-.8/.5-.7-1.3	3:1	
71.8- 75.8	.1-.3/.5-.7	4:1	Very occasionally grains 1.0
75.8- 77.6	.7-1.0/.5-.7	3:1	
77.6- 78.1	1.1-1.5		Loose
78.1- 82.3	1.0-1.3/1.5-.8	3:1	
82.3- 83.6	1.5-2.8		Air spaces; mostly cup shaped loose grains
83.6- 84.3	1.0-1.5		Loose crust at bottom 84.3-84.4
84.3- 88.5	1.3-2.1		Loose
88.5- 88.6			Crust
88.6- 95.1	1.2-1.5/1.8-2.1	3:1	
95.1-102.7	.8-1.0-1.1/1.3	2:1	
	occ. 1.5		
102.7-106.3	1.4-2.6		Loose grains with air space and some cup shaped crystals
106.3-114.1	1.0-.7-1.1/1.2	3:1	
114.1-119.5	1.3-1.7/1.7-2.5	2:1	114.1-114.2 slight crust
119.5-127.1	.8-1.0/1.1-1.3	3:1	
127.1-135.8	1.0-1.3/.7-1.5	3:1	
	Very occ. 2.0		
135.8-154.8	.7-.6/1.0-1.1	3:1	Slight crust at bottom, probable winter snow
154.8-173.1	1.1-1.4/1.5-1.8	2:1	
173.1-177.8	1.1-1.6/1.8-2.3	4:1	

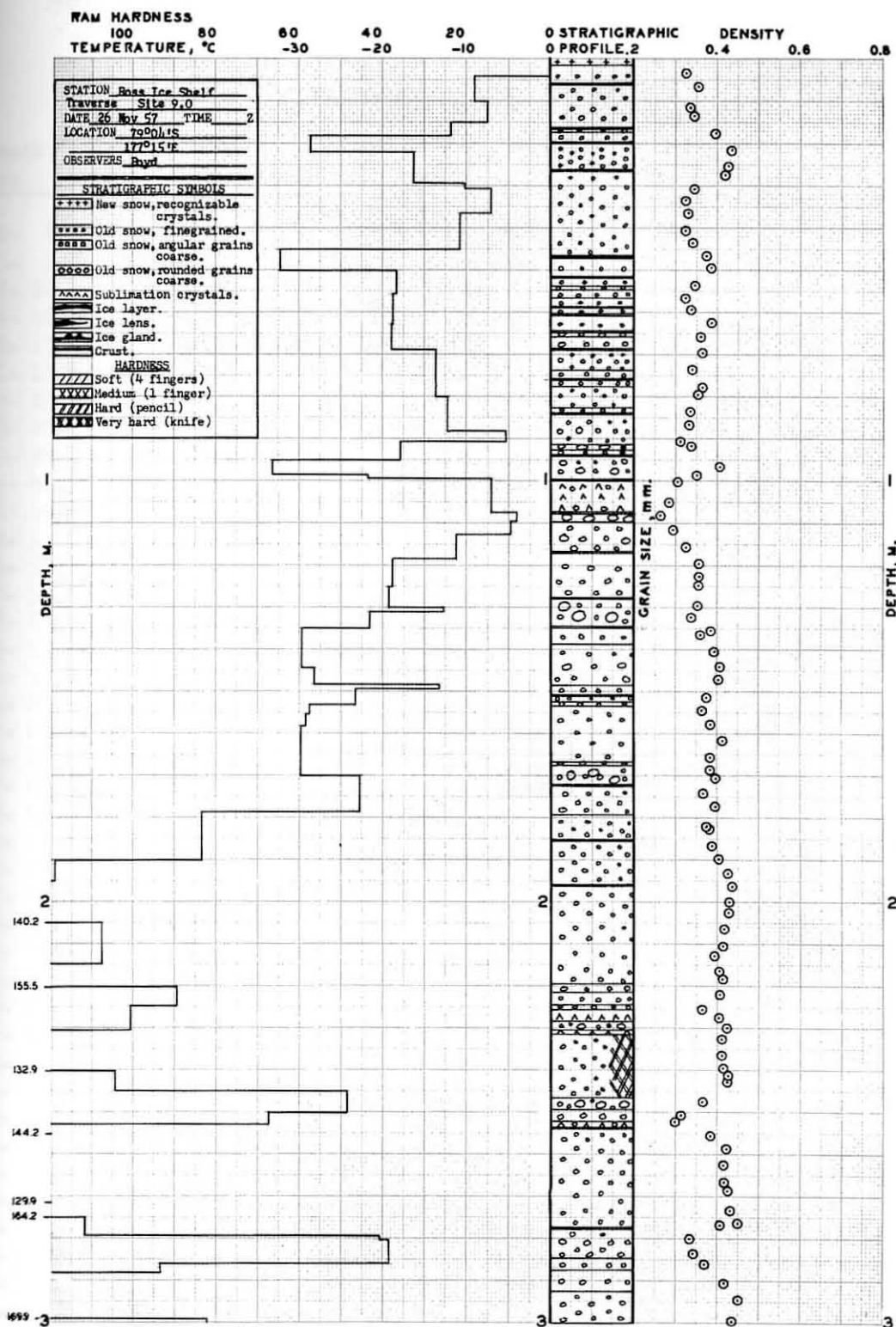
Ross Ice Shelf Traverse  
Site 8.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
177.8-177.9			Crust
177.9-178.5	1.3-1.6/1.6-1.8	2:1	
178.5-184.4	1.0-1.3/1.5-1.7 occ. 2.0		
184.4-184.5			Slight crust
184.5-189.7	1.3-1.8/2.0-2.5 occ. .5-.7	3:1	
189.7-189.8			Crust
189.8-194.3	.7-1.0/1.1-1.3	2:1	
194.3-199.1	1.3-2.1/2.5-.6-.8	3:1	Very irregular shaped layer
199.1-199.5	1.5-2.8		Air spaces
199.5-204.2	.7-1.0/1.1-1.3	4:1	
204.2-204.8	.6-.7/1.0	3:1	
204.8-205.3	1.0-1.1/1.3	3:1	
205.3-210.8	1.1-1.3-1.5/.7-1.0-2.0	3:1	Very slight crust at 210.8
210.8-217.1	1.1-1.7/1.7-2.1, .7-1.0	4:1	
217.1-219.1	1.0-1.5/1.6-.5-.8	3:1	
219.1-226.1	1.0-1.1/1.3-1.5, .7-.5	3:1	
226.1-226.5	1.1-1.5/1.0-.8 occ. .6	2:1	
226.5-241.1	.7-1.0/.3-.7-1.3	3:1	
241.1-245.6	1.0-1.3/.6-.8-1.5	2:1	
245.6-249.1	1.4-2.3		Loose, some cup shaped
249.1-250.2	.7-.5-.8/1.0	2:1	
250.2-250.6	1.2-1.7/1.8-2.0 occ. 2.0	3:1	
250.6-260.8	.7-1.0/1.0-1.2	3:1	
260.8-264.3	1.1-1.2-1.4/.6-.8-1.5	3:1	
264.3-270.6	1.3-1.8/.8-2.0-2.3	4:1	
270.6-273.3	1.5-2.3/1.0-1.3	3:2	
273.3-275.0	.6-.8-1.0/1.1	3:1	
275.0-279.1	1.1-1.3/1.3-1.6	2:1	
279.1-280.5	1.3-2.1		Loose
280.5-283.8	.7-1.0/1.1-1.3	2:1	
283.8-285.4	.8-1.0-1.1/1.3-.6	2:1	
285.4-293.2	.7-1.0/1.1-1.3	3:1	
293.2-296.5	1.3-2.6		Loose; some cupped
296.5-299.8	1.0-1.2/1.3-1.6	4:1	
299.8	1.2-1.8		Loose

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 8.2		14.5-16.6	36.5		
November 26, 1957		16.6-20.8	50.8		
0 - 2.7	3.6	20.8-23.8	13.2		
2.7- 5.3	14.7	23.8-30.5	33.0		
5.3- 8.8	37.5	30.5-32.5	35.7		
8.8-12.7	23.7	32.5-33.6	94.2		
12.7-21.6	12.8	33.6-37.0	126.7		
21.6-27.1	21.4	37.0-40.1	106.4		
27.1-29.7	34.0	40.1-43.4	94.2		
29.7-33.1	73.5	43.4-46.7	79.0		
33.1-38.9	113.5	46.7-51.0	31.1		
38.9-39.8	47.7	51.0-54.3	21.4		
39.8-50.3	90.8	54.3-58.0	30.3		
50.3-60.3	83.2	58.0-60.0	38.2		
60.3-62.3	53.2	60.0-70.0	39.2		
62.3-73.8	52.8	70.0-80.1	34.9		
73.8-75.5	38.5	80.1-83.3	15.7		
75.5-78.1	49.4	83.3-86.8	31.8		
78.1-79.8	273.7	86.8-89.0	130.4		
79.8-95.1	20.9	89.0-89.9	169.9		
95.1-99.0	52.9	89.9-92.1	94.2		
99.0-105.0	60.8	92.1-95.2	54.8		
105.0-115.1	66.6	95.2-99.8	60.8		
115.1-117.5	29.2	99.8-104.2	13.3		
117.5-125.0	41.5	104.2-107.8	5.6		
125.0-131.3	75.6	107.8-109.8	11.7		
131.3-140.0	109.9	109.8-111.5	24.8		
140.0-143.0	120.8	111.5-112.0	84.2		
143.0-151.4	176.7	112.0-114.0	174.2		
151.4-160.0	92.6	114.0-117.1	197.7		
160.0-170.1	142.8	117.1-120.0	121.4		
170.1-174.0	158.2	120.0-129.7	53.7		
174.0-178.0	441.8	129.7-134.8	39.5		
178.0-180.0	528.7	134.8-138.7	35.0		
180.0-184.9	494.2	138.7-150.1	102.6		
184.9-188.5	143.2	150.1-156.0	75.4		
188.5-190.0	70.8	156.0-164.1	96.8		
190.0-194.0	56.8	164.1-173.4	77.4		
194.0-197.2	48.0	173.4-179.0	68.6		
197.2-199.0	59.8	179.0-181.4	71.0		
		181.4-190.2	72.4		
		190.2-193.1	107.7		
Station 8.4		193.1-196.9	169.9		
November 26, 1957		196.9-199.5	292.4		
0 - 5.6	3.4				
5.6- 8.5	13.6				
8.5-12.1	17.1				
12.1-14.5	11.6				





Ross Ice Shelf Traverse  
 Station Site 9.0  
 Date 26 November 1957  
 Observer Boyd

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.5			New fallen snow
1.5- 5.7	.1/.2>.1	3:2	Very slight crust at bottom
5.7- 16.1	.2-.3/.5-.1	3:1	
16.1- 16.2			Crust
16.2- 17.1	.3-.5/.1-.2>.1	3:1	
17.1- 17.3	.5-.7/.1-.3	2:1	
17.3- 19.8	.2-.3/.1 occ. .5	3:1	Slight crust at 19.8
19.8- 26.0	.5-.6/.2-.3	3:1	
26.0- 26.1			Crust
26.1- 46.5	.5-.7/.2-.3 occ. .1	2:1	Slight crust at 26.5
46.5- 46.6			Double crust
46.6- 51.6	.3-.4/.5 occ. .7	2:1	Crust at bottom
51.6- 51.7			Crust
51.7- 53.8	.5/.3-.7	2:1	
53.8- 54.3	.5-.7/1.0-.3	2:1	Air spaces
54.3- 56.5	.5-.7/.8 occ. 1.0	2:1	
56.5- 58.4	.3-.5/.7-.8	2:1	Slight crust at 58.4
58.4- 60.2	1.0-.8/1.1-.5	2:1	
60.2- 60.3			Crust
60.3- 64.7	1.0-.8/.6-1.1	3:1	
64.7- 64.8			Crust
64.8- 65.8	.5-.7/1.0	3:1	
65.8- 68.6	1.0-1.5		Loose grains
68.6- 68.7			Crust
68.7- 73.9	1.0-1.1/.7-1.3	3:1	
73.9- 75.7	1.1-1.8		
75.7- 75.8			Crust at 75.7-75.8
75.8- 77.5	.7-1.4		Loose grains
77.5- 82.7	.7-1.0/1.1-.5	3:1	
82.7- 83.9	1.1-1.5/.7-1.0	3:1	Loose grains and air spaces
83.9- 84.0			Crust
84.0- 91.3	.7-.5-.8/1.0-1.2	3:1	
91.3- 92.4	1.3-2.1		Loose with air spaces
92.4- 93.8	1.0-1.1/1.3-.8	2:1	
93.8- 93.9			Crust
93.9- 99.7	.7-1.0/1.1-1.3	3:1	
99.7- 99.8			Crust
99.8-107.0	1.3-2.1		Loose grains; some cup shaped
107.0-107.1			Crust
107.1-109.8	1.8-2.7		Large loose cupped shaped grains with air spaces and grains occasionally 3.0 and larger
109.8-116.6	1.2-1.5/1.5-1.8	3:1	Slight crust at bottom



Ross Ice Shelf Traverse  
 Station Site 9.0  
 (Continued)

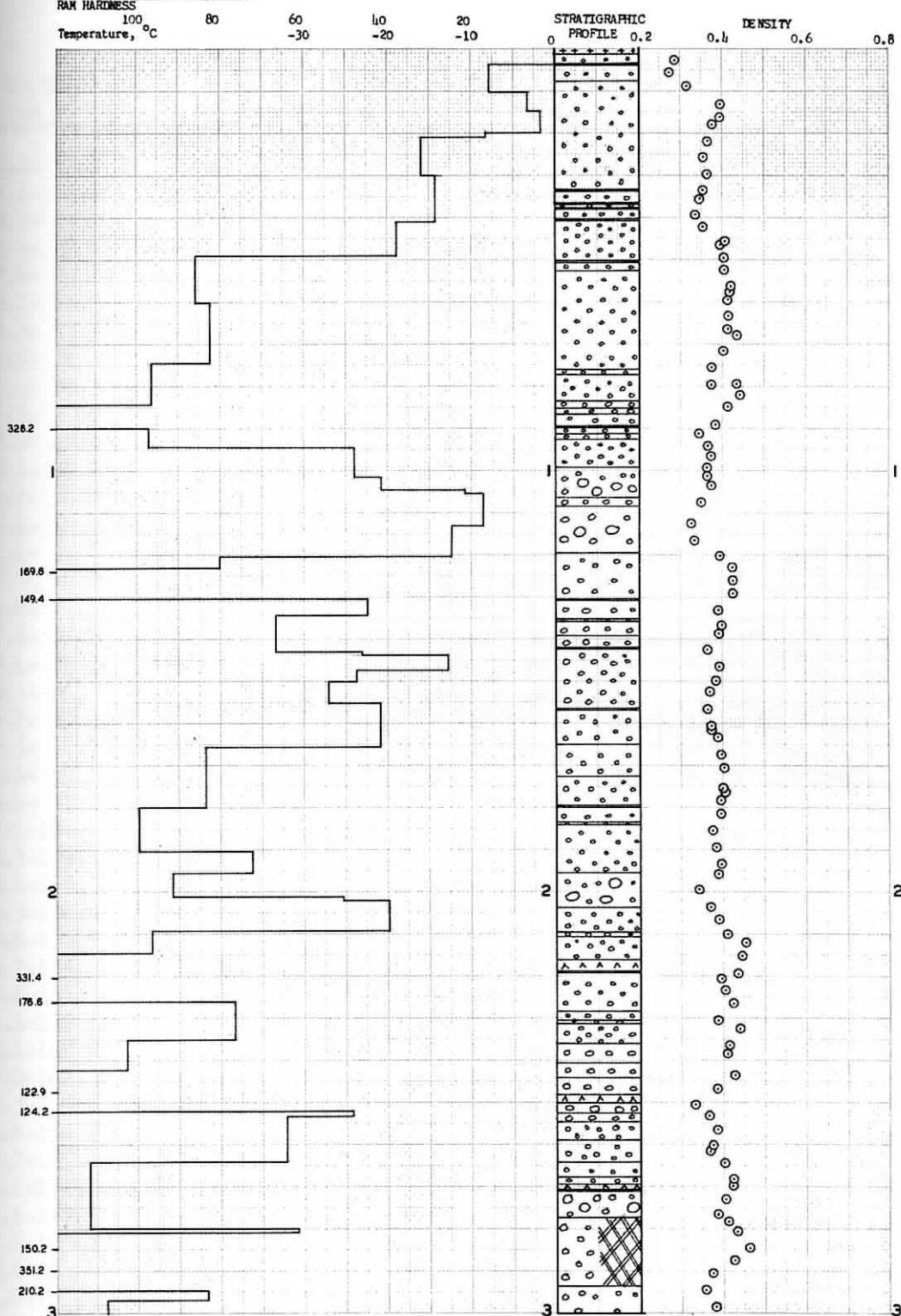
Depth cm	Grain Size	Ratio	Remarks
116.6-127.8	1.0-.7/1.1-1.3	3:1	Very slight crust at bottom
127.8-134.7	1.3-2.6		Loose
134.7-134.8			Crust
134.8-138.9	.7-1.0-1.1/1.1-1.3-.6	3:1	Occasionally grains to 1.5
138.9-148.5	.7-1.0/1.1 occ. 1.3	4:1	
148.5-150.8	1.3-1.0/1.5	3:1	
150.8-152.3	.7-1.1		Cemented layer
152.3-153.2	1.3-1.8/1.0-1.8-2.1	3:1	Loose
153.2-166.8	.5-.7-1.0/1.1-1.3	4:1	
166.8-167.5	1.0-1.3/1.3-1.6	3:1	
167.5-172.1	1.1-1.5/1.5-2.3	3:1	
172.1-172.3			Crust
172.3-179.1	.7-1.0/1.1 occ. 1.3	2:1	
179.1-185.1	.5-.7/1.0-1.3	3:1	
185.1-185.2			Crust
185.2-195.8	.8-1.0-.5/1.1-1.3	4:1	
195.8-195.9			Crust
195.9-219.5	.5-.7/1.0-1.3	2:1	
219.5-221.1	1.1-1.3/1.0-.8	4:1	
221.1-224.4	.7-.6/1.0 occ. 1.1	4:1	
224.4-226.6	1.0/.7-.8-1.1	3:1	
226.6-228.3	1.5-3.1		Loose; some cup shaped
228.3-230.3	.7-1.0		Well cemented; occasionally larger grains to 1.3
230.3-231.5	1.3-2.4		Mostly cup shaped grains
231.5-246.3	.7-.8/1.0-1.2	4:1	Very hard packed
246.3-249.1	1.0-1.1/.7-1.0	3:2	
249.1-252.2	1.3-1.5-1.7/1.0-1.1-2.0	3:1	Very loose grains
252.2-253.8	1.5-2.8		Loose grains; few cup shaped; crust from 252.2-252.3
253.8-277.8	.5-.7/1.0 occ. 1.2	3:1	(Winter?)
277.8-284.5	1.1-1.3/1.0 occ. 1.5	3:2	Crust from 277.8-277.9
284.5-287.6	1.0-1.1/1.3-1.5	2:1	
287.6-292.5	.7-1.0/.5-1.1	3:1	
292.5-300.4	.7-.5/1.0-.8	2:1	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 9.2		192.1-197.7	102.4		
November 29, 1957		197.7-199.8	99.5		
0 - 3.0	3.5	Station 9.4			
3.0- 7.2	27.0	November 29, 1957			
7.2- 10.4	40.7	0 - 8.1	3.3		
10.4- 23.1	42.6	8.1- 17.5	9.6		
23.1- 24.5	17.5	17.5- 21.8	26.5		
24.5- 27.5	16.5	21.8- 24.8	33.5		
27.5- 30.5	19.8	24.8- 30.2	43.9		
30.5- 35.8	24.0	30.2- 33.4	59.4		
35.8- 44.3	52.6	33.4- 35.0	128.2		
44.3- 50.3	98.2	35.0- 40.2	166.7		
50.3- 57.4	70.8	40.2- 45.5	191.8		
57.4- 60.1	55.0	45.5- 50.2	184.2		
60.1- 70.0	47.7	50.2- 60.5	192.6		
70.0- 80.6	76.8	60.5- 61.0	103.2		
80.6- 83.5	86.0	61.0- 70.3	67.6		
83.5- 84.2	60.3	70.3- 80.2	88.0		
84.2- 85.1	58.7	80.2- 88.9	123.8		
85.1- 87.5	86.6	88.9- 97.0	131.6		
87.5- 89.7	185.0	97.0-101.3	69.4		
89.7- 90.2	83.2	101.3-102.0	32.8		
90.2- 96.3	62.2	102.0-108.7	32.6		
96.3- 97.9	179.2	108.7-118.7	70.2		
97.9-105.1	129.2	118.7-119.2	44.2		
105.1-108.8	77.2	119.2-123.9	36.1		
108.8-109.3	64.2	123.9-127.3	92.4		
109.3-117.7	47.0	127.3-143.0	159.7		
117.7-118.3	20.8	143.0-148.7	284.3		
118.3-123.9	14.0	148.7-149.5	66.7		
123.9-130.1	42.9	149.5-155.1	93.6		
130.1-134.3	47.1	155.1-165.5	67.6		
134.3-140.1	87.0	165.5-170.0	141.8		
140.1-144.2	62.8				
144.2-145.5	35.0				
145.5-147.9	50.0				
147.9-149.9	114.2				
149.9-155.5	104.2				
155.5-156.8	35.0				
156.8-157.5	61.3				
157.5-163.7	57.4				
163.7-175.1	109.5				
175.1-175.6	84.2				
175.6-181.4	45.6				
181.4-186.3	49.1				
186.3-190.5	56.6				
190.5-192.1	97.6				

STATION Ross Ice Shelf  
 Traverse Site 10.0  
 DATE 30 November 57  
 LOCATION 78°59'S  
 171°55'E  
 OBSERVER Boyd



Ross Ice Shelf Traverse  
 Station Site 10.0  
 Date 30 November 1957  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.1			Thin layer of new snow
1.1- 3.3	.3-.5/.2-.1	2:1	
3.3- 3.4			Crust
3.4- 7.6	.7-.8/.3-.2 Very occ. 1.0	3:1	
7.6- 33.2	.2-.1-.3/.5-.7	3:1	
33.2- 33.3			Crust
33.3- 33.5	.7-1.0		
33.5- 36.4	.3-.2/.5-.1	3:1	Crust at 36.4
36.4- 37.5	.5-.3/.2-.1	3:1	
37.5- 37.6			Crust
37.6- 40.1	.2-.5/.6-.1	3:1	
40.1- 40.2			Crust
40.2- 50.4	.7-1.0/.5-.3 occ. .2	2:1	
50.4- 52.4	1.0-.5-.3-.7/.1-.2	3:1	Crust at top
52.4- 52.8	1.0-1.6/1.8-2.1	4:1	Loose grains and air spaces
52.8- 76.0	.3-.5/.7-1.0	5:1	
76.0- 77.2	1.0-.7-1.1/.5-.3	3:1	
77.2- 83.4	.3-.5/.7	3:1	Well packed
83.4- 85.1	1.0-.7/.5-.3	2:1	
85.1- 86.7	.3-.2-.5/.7-1.0	3:1	
86.7- 89.5	1.0-.8-1.1/.5-.3-.7	4:1	Crust from 89.5-89.6
89.5- 91.1	1.0-1.1-1.3/.7-1.0	3:1	
91.1- 92.4	1.0-1.8		Air spaces and loose grains
92.4- 99.1	1.0-1.1-1.3/.8-.6	3:1	
99.1-106.3	1.5-2.3		Loose
106.3-108.4	1.0/.7-1.1	3:1	
108.4-119.3	1.3-1.5/2.0-.8	4:1	
119.3-130.6	.7-.8-1.0/.5-1.2	4:1	
130.6-130.7			Crust
130.7-135.2	1.0-1.1/.7-.8-1.2	3:1	
135.2-135.5	1.3-2.1		Loose
135.5-139.1	1.0-1.1-1.2/1.3-.7	2:1	
139.1-142.0	.7-.8-1.0/1.1-1.3	4:1	
142.0-142.3			Crust
142.3-156.6	1.1-1.3-1.5/1.7-.8	2:1	
156.6-156.7			Crust
156.7-165.1	1.0-1.3/1.5-.7	3:1	
165.1-172.5	1.0-.7/.6-1.1	3:1	
172.5-179.5	.6-.7/1.0	3:1	Crust from 179.5-179.6
179.5-183.8	.6-.7/.8-1.0	4:1	
183.8-184.0	.6-.8/1.0	2:1	
184.0-195.4	1.0-1.3/1.5-.7	3:2	
195.4-203.9	1.1-2.3		Loose

Ross Ice Shelf Traverse  
 Station Site 10.0  
 (Continued)

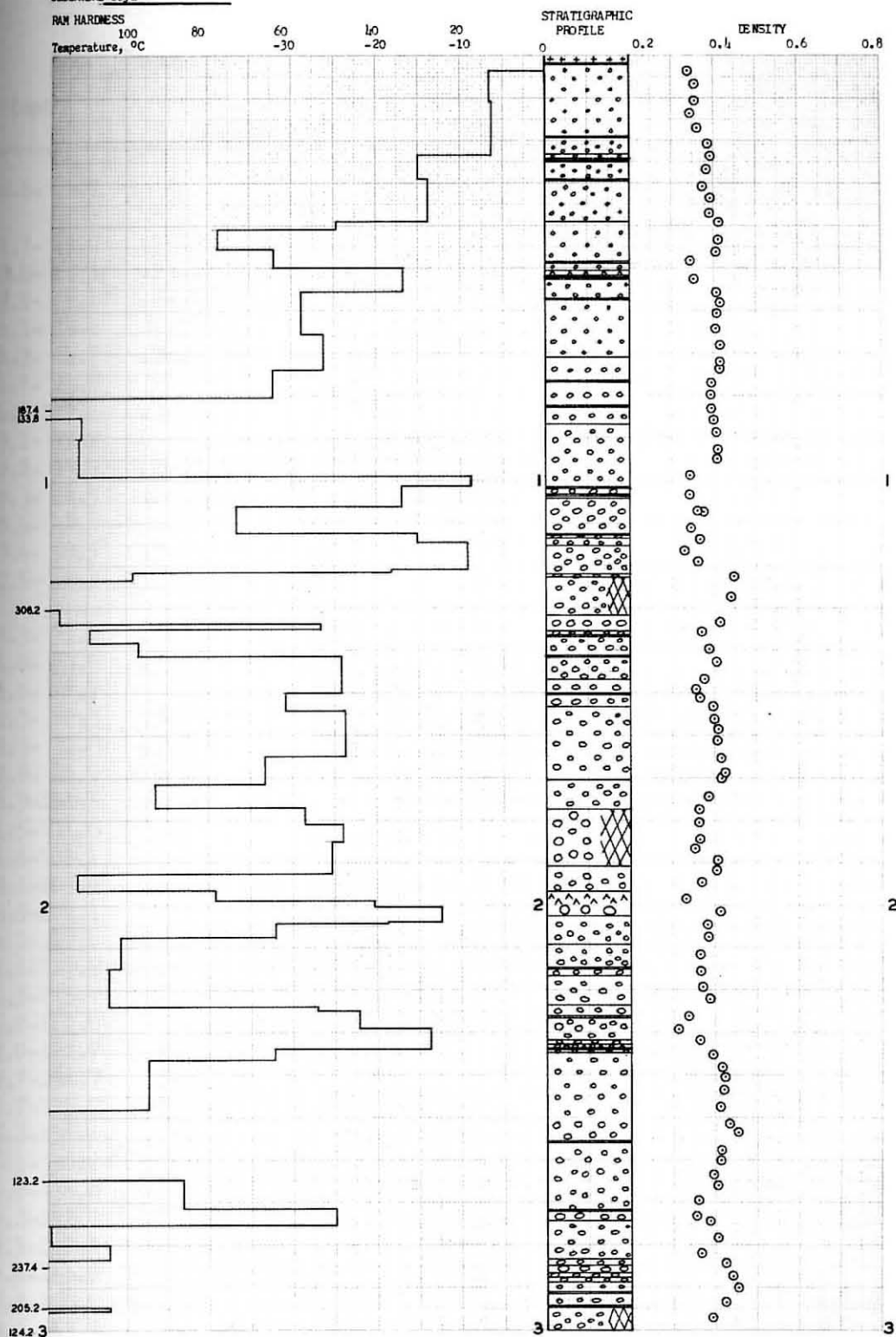
Depth cm	Grain Size	Ratio	Remarks
203.9-209.8	1.0-.7-.8/1.1-1.3	3:1	
209.8-210.7	1.5-2.8		Loose with air spaces
210.7-216.1	1.0-.8/.5-1.1	3:1	Very well cemented
216.1-219.0	1.6-3.2		Loose; some cupped
219.0-219.1			Crust
219.1-228.4	1.0-1.1-.7/.5-1.3	4:1	
228.4-230.0	1.0-1.2/.7-1.0	4:1	
230.0-231.2	1.0-1.3/.8-1.0	4:1	
231.2-236.0	1.1-1.0/1.3-.8	2:1	
236.0-240.3	1.0-1.3-1.2 occ. 1.5/.6	2:1	Very occasionally grains 1.7
240.3-244.2	1.0-.7/1.1-1.3	2:1	
244.2-248.1	1.0-1.1-.8/1.3	4:1	Loose
248.1-250.1	1.8-3.5/1.0-1.3	5:1	Air spaces and some cup shaped crystals
250.1-252.5	1.0-1.1-1.3/2.0-.6-.8	3:1	
252.5-254.4	1.3-2.4		Loose with air spaces
254.4-259.0	1.3-1.5/1.0-.8-1.2	3:1	
259.0-264.1	1.3-1.6/.8-1.1	3:2	
264.1-272.9	.8-.5/1.0-1.3	4:1	
272.9-274.4	1.0-1.2/.8-1.3	4:1	
274.4-275.7	1.5-2.8/1.0-1.3		Loose; cupped shaped crystals
275.7-275.8			Crust
275.8-277.2	1.3-1.8/2.0-2.7	5:1	
277.2-293.6	.7-1.0/1.1 occ. 1.2	5:1	Very hard packed
293.6-300.0	1.5-3.1		Loose

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 10.2		Station 10.4		173.1-175.0	267.2
December 2, 1957		December 2, 1957		175.0-180.0	204.2
0 - 4.0	3.5	0 - 5.5	3.4	180.0-184.1	236.1
4.0- 10.0	20.7	5.5- 8.6	14.5	184.1-190.0	105.9
10.0- 13.7	27.5	8.6- 10.3	12.0	190.0-194.3	136.7
13.7- 20.0	30.2	10.3- 13.8	14.6	194.3-199.9	343.5
20.0- 25.0	37.2	13.8- 15.0	32.4		
25.0- 31.7	62.8	15.0- 20.0	47.2		
31.7- 33.0	141.7	20.0- 21.2	53.2		
33.0- 36.5	128.9	21.2- 23.0	19.9		
36.5- 37.1	69.8	23.0- 30.1	49.7		
37.1- 50.0	94.0	30.1- 34.0	49.4		
50.0- 56.4	97.0	34.0- 37.1	90.3		
56.4- 60.1	151.7	37.1- 39.0	87.4		
60.1- 70.2	201.2	39.0- 39.6	89.8		
70.2- 73.5	109.2	39.6- 46.9	45.7		
73.5- 74.5	103.2	46.9- 58.0	41.0		
74.5- 82.8	53.5	58.0- 62.2	43.7		
82.8- 86.0	24.5	62.2- 69.1	94.5		
86.0- 92.2	23.4	69.1- 74.1	43.2		
92.2- 98.6	135.9	74.1- 74.5	28.2		
98.6-103.1	66.4	74.5- 80.1	60.5		
103.1-104.0	48.7	80.1- 84.7	72.8		
104.0-110.5	32.4	84.7- 87.2	63.2		
110.5-113.4	80.0	87.2- 88.0	40.7		
113.4-118.1	140.3	88.0- 92.0	58.2		
118.1-120.0	214.7	92.0- 97.0	103.2		
120.0-124.9	134.8	97.0-100.0	91.0		
124.9-128.6	112.2	100.0-101.5	57.5		
128.6-129.3	75.6	101.5-104.0	32.2		
129.3-133.6	106.4	104.0-104.7	18.5		
133.6-134.5	93.2	104.7-108.1	17.5		
134.5-140.0	58.8	108.1-110.8	26.4		
140.0-141.9	83.2	110.8-114.7	27.6		
141.9-150.0	85.6	114.7-120.2	69.6		
150.0-160.0	144.2	120.2-124.0	130.4		
160.0-164.0	116.7	124.0-140.0	66.8		
164.0-164.9	59.8	140.0-145.5	105.9		
164.9-178.0	107.3	145.5-148.2	33.8		
178.0-184.6	137.4	148.2-150.0	34.8		
184.6-185.7	367.7	150.0-154.0	34.2		
185.7-190.0	457.5	154.0-160.0	77.6		
190.0-193.0	387.4	160.0-167.7	70.4		
193.0-197.1	333.7	167.7-169.5	226.3		
197.1-199.8	245.0	169.5-173.1	434.3		

STATION Ross Ice Shelf  
 Traverse Site 11.0  
 DATE 2 December 57  
 LOCATION 78°53'S  
 172°20'E  
 OBSERVERS Boyd





Ross Ice Shelf Traverse  
 Station Site 11.0  
 Date 2 December 1957  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth	Grain Size	Ratio	Remarks
0.0- 1.7			New fallen snow; slight crust at 1.7
1.7- 19.0	.1-.2>.1/.3	2:1	Very slight crust at 19.0
19.0- 23.1	.1>.1/.2 occ. .3	4:1	
23.1- 24.1	.2-.1/.3 occ. .5	3:2	
24.1- 24.2			Crust
24.2- 24.7	.2-.3/.5	2:1	
24.7- 24.8			Crust
24.8- 29.1	.3-.5/.2-.1	3:2	
29.1- 29.2			Crust
29.2- 39.3	.2-.1/.3-.5 occ. .6	3:1	
39.3- 48.5	.2-.1/.3-.5	4:1	
48.5- 48.6			Crust
48.6- 50.5	.3-.5/.6-.2-.1	2:1	Slightly cemented
50.5- 52.3	1.0-1.1/.7-.5	3:1	Crust 51.2-51.3; some cup shaped crystals; crust 51.9-52.0
52.3- 71.0	.7-1.0/.5-.3-.2	3:2	Slight crust at 57.4
71.0- 76.6	.7-.8-1.0/1.1-.5-.3	2:1	
76.6- 76.7			Crust
76.7- 82.3	.5-.7-.8/1.0-1.2	3:1	
82.3- 82.8	.7-1.0		
82.8- 86.9	1.0-.7/.5-1.1-.3	2:1	
86.9-101.5	.7-.5-.3/1.0	3:1	
101.5-101.6			Crust
101.6-103.1	1.0-1.4		Loose
103.1-103.9	.7-1.0-1.1/1.3-.6	3:1	
103.9-104.1			Crust
104.1-112.6	1.0-1.1-1.3/.5-.7-.8	3:2	Crust from 112.5-112.6
112.6-113.5	1.0-.7/1.1-1.3	2:1	
113.5-115.2	1.0-1.7		Loose crystals
115.2-122.0	1.0-1.2-1.3/.8-1.5	3:1	
122.0-122.7	1.8-2.1		Loose grains
122.7-131.7	.3-.5/.7	3:1	Very well packed
131.7-135.2	1.1-1.4/1.0-1.5-1.6	4:1	
135.2-136.1	.7-.9		Cemented
136.1-136.2			Crust
136.2-136.8	.8-1.1		Slightly cemented
136.8-142.3	.8-1.0-1.2/1.3-1.5-.6	3:1	
142.3-142.4			Crust
142.4-146.9	1.0-1.2/1.3-1.7	2:1	
146.9-150.0	1.0-1.3-1.5/1.5-1.8	4:1	Very slight crust at 150.0
150.0-153.2	.7-1.0/1.1-1.3	2:1	
153.2-170.5	1.0/.7-1.2-1.4	2:1	

Ross Ice Shelf Traverse  
 Station Site 11.0  
 (Continued)

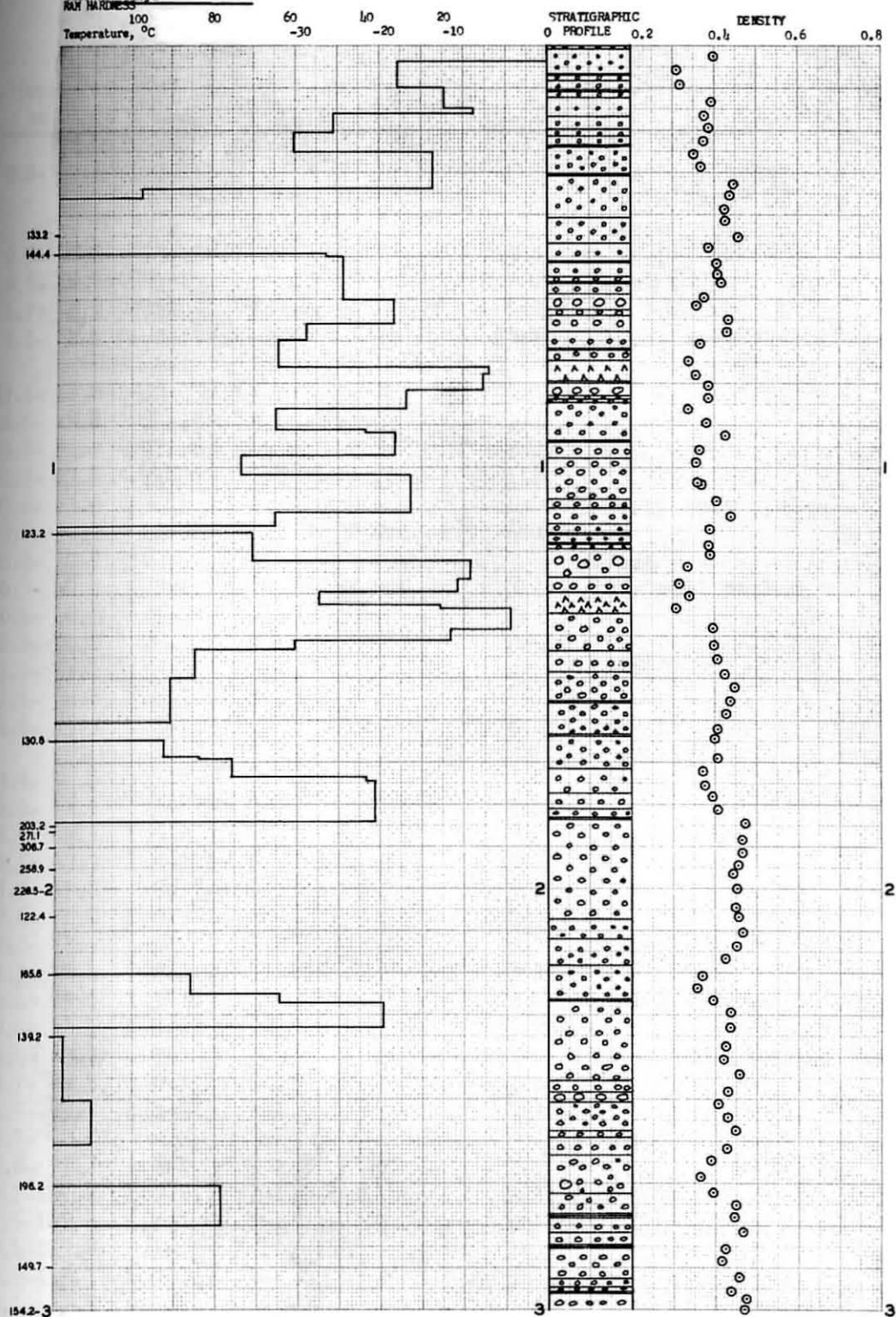
Depth cm	Grain Size	Ratio	Remarks
170.5-177.4	.7-1.0/1.2	3:1	
177.4-190.8	1.1-1.5/.5-2.1; .7-1.0	3:1	Well packed
190.8-196.8	.7-1.0/1.3-1.5	4:1	
196.8-202.7	1.5-3.2		Large loose crystals
202.7-209.2	.8-1.0/.6-1.2	3:1	
209.2-214.8	1.1-1.3/.8-1.5-1.7	3:1	
214.8-214.9			Crust
214.9-216.7	.5-.7-.8/1.0 occ. 1.2	3:1	
216.7-223.8	1.2-1.3/1.0-1.5	3:1	
223.8-226.0	.7-.8/1.0 occ. 1.3	3:1	Slight crust at 226.0
226.0-231.8	1.5-3.1		Large loose grains
231.8-232.7	1.0-1.3		Cemented
232.7-233.7	1.5-3.6		Cemented crust from 233.7-233.8; large loose, some cupped shaped grains
233.7-233.8			Crust
233.8-234.7	1.0-1.3		Cemented
234.7-255.3	1.0-1.3/1.3-1.5-.8-.6	3:1	
255.3-255.4			Crust
255.4-271.8	.8-1.0-1.2/.5-1.3-1.5	5:1	
271.8-271.9			Crust
271.9-274.3	1.6-3.1		Large loose grains, slightly cemented at bottom
274.3-283.1	.7-1.0/.5-1.1-1.3	3:1	
283.1-284.8	.6-.8/1.0-1.2	3:1	
284.8-286.5	1.5-2.3		Loose grains
286.5-287.4	1.5-2.6		Loose grains
287.4-288.7	1.3-1.5/.7-2.0	3:1	
288.7-291.0	.5-.7/1.0	2:1	Cemented
291.0-291.1			Crust
291.1-294.2	1.0-1.1/.7-1.3	3:2	
294.2-294.3			Crust
294.3-300.0	1.0-1.3/.7-.8-1.3-1.6	4:1	Well packed

# RM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 11.2		35.0-40.0	35.2	72.1-72.7	69.8
December 4, 1957		40.0-42.0	103.2	72.7-78.2	32.3
0 - 3.8	3.5	42.0-44.0	183.2	78.2-79.5	18.6
3.8-9.1	35.3	44.0-50.2	180.7	79.5-83.7	40.3
9.1-13.0	21.2	50.2-54.0	95.4	83.7-87.1	115.1
13.0-15.6	26.3	54.0-60.5	118.6	87.1-90.0	237.9
15.6-16.5	14.3	60.5-73.3	108.7	90.0-93.8	293.2
16.5-20.5	15.7	73.3-74.4	48.7	93.8-97.2	324.0
20.5-23.8	15.3	74.4-78.1	57.2	97.2-101.1	171.1
23.8-33.0	16.8	78.1-79.0	47.7	101.1-105.2	158.2
33.0-35.0	78.2	79.0-86.0	67.6	105.2-112.8	79.2
35.0-39.2	110.4	86.0-90.0	153.2	112.8-118.8	91.0
39.2-43.5	40.4	90.0-99.0	198.7	118.8-126.2	65.0
43.5-44.4	25.4	99.0-110.0	95.2	126.2-133.8	41.1
44.4-54.8	31.1	110.0-120.0	128.2	133.8-140.1	85.2
54.8-57.0	157.7	120.0-130.2	200.2	140.1-150.0	101.2
57.0-61.0	190.7	130.2-135.7	158.7	150.0-153.8	98.9
61.0-62.5	103.2	135.7-143.9	106.7	153.8-159.7	402.2
62.5-63.4	58.8	143.9-149.0	239.4	159.7-162.0	894.2
63.4-69.0	53.2	149.0-155.1	315.7	162.0-163.1	1051.2
69.0-76.1	82.2	155.1-160.0	361.2	163.1-165.0	705.2
76.1-80.1	93.2	160.0-165.0	214.2	165.0-170.0	154.2
80.1-81.2	30.5	165.0-180.0	77.5	170.0-174.7	164.2
81.2-85.0	74.3	180.0-190.1	134.8	174.7-177.2	104.2
85.0-92.1	118.7	190.1-199.3	108.5	177.2-180.0	111.3
92.1-96.1	88.2	199.3-200.0	90.0		
96.1-96.6	304.2				
96.6-98.0	161.3				
98.0-100.5	172.2	Station 11.6			
100.5-101.0	264.2	December 4, 1957			
101.0-107.0	119.2	0 - 2.2	3.7		
107.0-110.0	157.5	2.2-8.2	8.2		
110.0-114.1	131.0	8.2-12.3	13.0		
114.1-115.0	48.7	12.3-18.2	37.0		
115.0-118.3	34.5	18.2-21.0	74.6		
118.3-119.5	104.2	21.0-25.7	45.7		
119.5-120.1	204.2	25.7-28.4	58.7		
		28.4-30.2	47.7		
		30.2-31.6	31.8		
		31.6-35.7	47.2		
		35.7-40.1	57.7		
		40.1-50.1	79.2		
		50.1-59.8	71.2		
		59.8-61.1	187.6		
		61.1-64.3	221.6		
		64.3-65.1	65.7		
		65.1-70.1	83.2		
		70.1-72.1	63.2		
Station 11.4					
December 4, 1957					
0 - 3.3	3.5				
3.3-7.0	19.6				
7.0-15.3	36.9				
15.3-17.0	62.1				
17.0-20.0	56.6				
20.0-29.0	41.0				
29.0-35.0	39.9				

STATION Ross Ice Shelf  
 Traverse Site 12.0  
 DATE 4 December 57  
 LOCATION 78°06'S  
 170°15'E  
 OBSERVER Boyd  
 RAN HARDNESS



Ross Ice Shelf Traverse  
 Station Site 12.0  
 Date 4 December 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.5	1.0-1.5		Crystal plates; broken very thin layer of new fallen snow
0.5- 6.6	.3-.5/.7-.1	5:1	
6.6- 6.7			Crust
6.7- 8.2	.2-.3-.5/.7 occ. .1	4:1	
8.2- 12.1	1.0-.7/.5-.3	3:2	Loose; very slight crust at 10.5
12.1- 16.6	.2-.3/.5-.7	3:1	
16.6- 19.8	.3-.5-.7/.1-.2	3:1	
19.8- 21.2	.7-.8/.5-1.0	3:1	
21.2- 23.6	.1-.2/.3-.5 occ. .7	4:1	
23.6- 23.8			Crust; very irregular
23.8- 30.2	.2-.4/.5-.7 Very occ. 1.0	5:1	
30.2- 30.3			Crust
30.3- 40.4	.7-1.0/.3-.5 occ. .1	3:1	Very well packed
40.4- 46.8	.5-.7/.3-1.0	2:1	
46.8- 51.0	.8-1.0/.5-1.1	3:1	
51.0- 51.1			Crust
51.1- 54.8	1.0-1.1/.8-.5-.3	3:1	
54.8- 55.9	1.0-1.3/1.5	4:1	Very thin layer; these grains overlying first crust
55.9- 56.0			Crust
56.0- 58.9	.5-.7/1.0	3:1	
58.9- 62.5	1.5-2.3		Loose
62.5- 63.9	1.0-1.1/.5-.7 occ. 1.3	3:1	
63.9- 67.8	.5-.7-1.0/.3-1.1	3:1	
67.8- 71.8	1.0/.5-.7	3:1	
71.8- 71.9			Crust
71.9- 74.4	1.0-1.2/1.3-1.5-.7	3:1	
74.4- 79.6	1.5-2.3		Loose; some cupped
79.6- 83.4	1.0-1.3/.5-.8-1.5	3:1	
83.4- 83.7	.7-1.0		Crust and cemented grains
83.7- 84.5	1.0-1.1/.5-.7	3:1	
84.5- 93.7	1.0-1.3/.7-1.5-1.6	3:1	
93.7- 93.8			Crust
93.8- 97.7	.8-1.0/.5-1.2	3:1	
97.7-107.5	1.0-1.5/.7-1.6-1.8	3:1	
107.5-109.4	.7-1.0/.3-.5	2:1	
109.4-113.8	.3-.5-.7/1.0-1.3	3:1	
113.8-115.3	1.0-1.5/.7-1.6	3:1	Crust at bottom
115.3-117.9	1.0-1.2/.7-1.3	3:1	Crust at 117.8-117.9
117.9-119.2	1.0-1.2		Slightly cemented

Ross Ice Shelf Traverse  
 Station Site 12.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
119.2-126.0	1.6-3.2		Loose
126.0-129.7	1.0-1.3-1.5/1.7-2.1	3:1	In some localities a hard cemented layer from 129.5- 133.0 may wedge in
129.7-135.4	1.8-3.5		Loose; some cup shaped
135.4-143.5	1.0-1.3/.5-.7-1.5	3:1	
143.5-148.4	1.1-1.3-1.5/1.0 and 1.7	5:1	
148.4-155.3	.7-1.0/1.1-1.3-.5	3:1	Slight crust at 155.3
155.3-163.4	1.1-1.3/.7-1.0	3:1	
163.4-163.5			Crust
163.5-171.3	.8-1.0/1.1-1.3-.5	2:1	
171.3-177.2	1.0-1.3-1.5/.8-1.7	3:1	Slight zone of enlarged grains 177.1-177.2
177.2-181.0	.7-1.0/1.1-1.3	5:1	
181.0-183.2	1.3-1.5-1.7/.8-1.0-1.8	3:1	
183.2-183.3			Crust
183.3-207.1	.5-.7/1.0-1.2	4:1	Well packed
207.1-212.0	.7-1.0/.5-.6-1.1	3:1	
212.0-217.2	1.0-1.2/1.3-1.5-.8	4:1	
217.2-226.4	1.2-1.3-1.5/.7-1.0	3:1	
226.4-226.5			Crust
226.5-245.3	1.0-1.3/.7-1.0-1.3-1.5	3:1	
245.3-248.5	.7-1.2		Cemented
248.5-250.5	1.8-3.4		Loose with air spaces
250.5-257.7	1.1-1.3/.7-1.0-1.5-1.7	4:1	
257.7-259.0	1.1-1.5/.8-1.0	2:1	
259.0-263.1	.7-1.1/1.1-1.4	4:1	Cemented layer
263.1-272.2	1.3-1.8/1.0-1.8-2.4	2:1	
272.2-277.1	1.1-1.2/.8-1.0-1.5	3:1	
277.1-277.3			Crust
277.3-278.0	1.1-1.6/.7-1.0	4:1	
278.0-278.1			Crust
278.1-281.4	.8-1.1/1.1-1.3	3:1	Slightly cemented
281.4-284.4	.6-1.1-1.3-1.5/1.6	3:1	
284.4-284.5			Crust
284.5-285.1	1.3-1.5/.6-.8-1.0	3:2	
285.1-285.2			Crust
285.2-292.6	.7-1.1/1.1-1.5	3:2	
292.6-294.5	.7-1.0/1.1-1.3	5:1	
294.5-295.3	1.1-1.5/.8-1.7	3:2	Crust at 295.3-295.4
295.3-295.4			Crust
295.4	.7-.8-1.0/1.1-1.3	4:1	



# RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 12.2		180.0-182.6	119.6	146.5-149.3	161.4
December 6, 1957		182.6-185.1	232.2	149.3-150.0	61.4
0 - 5.0	3.4	185.1-192.0	287.2	150.0-158.2	62.8
5.0- 10.1	26.7	192.0-196.1	187.2	158.2-168.3	83.4
10.1- 11.6	9.9	196.1-199.9	109.4	168.3-169.7	32.8
11.6- 14.1	11.2			169.7-174.0	57.6
14.1- 15.1	8.2	Station 12.4		174.0-176.3	56.4
15.1- 19.8	7.5	December 6, 1957		176.3-177.5	29.2
19.8- 22.3	13.2	0 - 5.0	3.4	177.5-179.5	44.2
22.3- 26.1	40.0	5.0- 7.0	35.7	179.5-179.9	54.2
26.1- 31.2	58.1	7.0- 10.1	48.4	179.9-182.0	175.7
31.2- 32.2	23.2	10.1- 25.6	40.0	182.0-185.4	298.2
32.2- 34.0	42.0	25.6- 29.0	36.0	185.4-186.6	45.9
34.0- 39.6	72.8	29.0- 30.1	21.4	186.6-193.6	49.9
39.6- 45.7	36.0	30.1- 34.7	35.8	193.6-194.0	54.2
45.7- 54.9	84.8	34.7- 40.2	57.8	194.0-200.0	64.2
54.9- 60.1	64.8	40.2- 41.0	28.2		
60.1- 75.5	63.6	41.0- 46.5	43.2	Station 12.6	
75.5- 80.8	48.5	46.5- 49.1	130.1	December 6, 1957	
80.8- 82.5	38.5	49.1- 53.3	110.3	0 - 4.5	3.4
82.5- 86.4	16.0	53.3- 54.5	44.9	4.5- 7.1	16.6
86.4- 88.0	25.1	54.5- 58.6	54.4	7.1- 10.1	79.8
88.0- 90.2	48.7	58.6- 61.0	40.7	10.1- 15.0	68.6
90.2- 91.4	104.2	61.0- 65.0	63.2	15.0- 21.7	68.8
91.4- 94.6	107.3	65.0- 68.5	63.2	21.7- 22.4	31.8
94.6- 99.7	21.2	68.5- 69.3	40.7	22.4- 26.0	18.5
99.7-103.5	18.7	69.3- 71.5	57.8	26.0- 30.4	10.0
103.5-107.5	29.2	71.5- 73.8	16.3	30.4- 34.6	19.9
107.5-110.1	58.0	73.8- 74.4	53.2	34.6- 35.0	28.2
110.1-117.4	94.6	74.4- 76.5	22.3	35.0- 38.1	29.0
117.4-124.1	69.9	76.5- 80.5	88.2	38.1- 40.3	30.5
124.1-128.1	131.7	80.5- 85.0	89.8	40.3- 41.0	31.8
128.1-130.1	154.2	85.0- 86.0	33.2	41.0- 43.0	43.2
130.1-131.1	54.2	86.0- 90.8	47.0	43.0- 54.7	69.8
131.1-134.8	31.3	90.8- 94.8	14.2	54.7- 60.6	30.3
134.8-137.8	27.5	94.8- 97.5	19.0	60.6- 61.0	53.2
137.8-145.2	58.4	97.5-102.9	28.3	61.0- 69.8	92.2
145.2-145.8	37.5	102.9-108.6	60.4	69.8- 73.7	31.4
145.8-147.1	58.0	108.6-119.4	106.1	73.7- 74.3	19.9
147.1-151.4	53.0	119.4-122.1	115.3	74.3- 79.5	18.6
151.4-154.0	219.4	122.1-123.1	54.2	79.5- 84.6	58.1
154.0-157.3	170.9	123.1-126.3	32.3	84.6- 87.7	16.1
157.3-164.9	125.2	126.3-128.1	20.9	87.7- 92.0	9.0
164.9-169.7	110.4	128.1-130.4	21.6	92.0- 95.0	9.9
169.7-170.3	54.2	130.4-130.9	24.2	95.0- 98.8	19.0
170.3-177.8	60.2	130.9-134.0	75.2	98.8-101.3	40.2
177.8-180.0	86.0	134.0-146.5	420.2	101.3-110.4	93.2

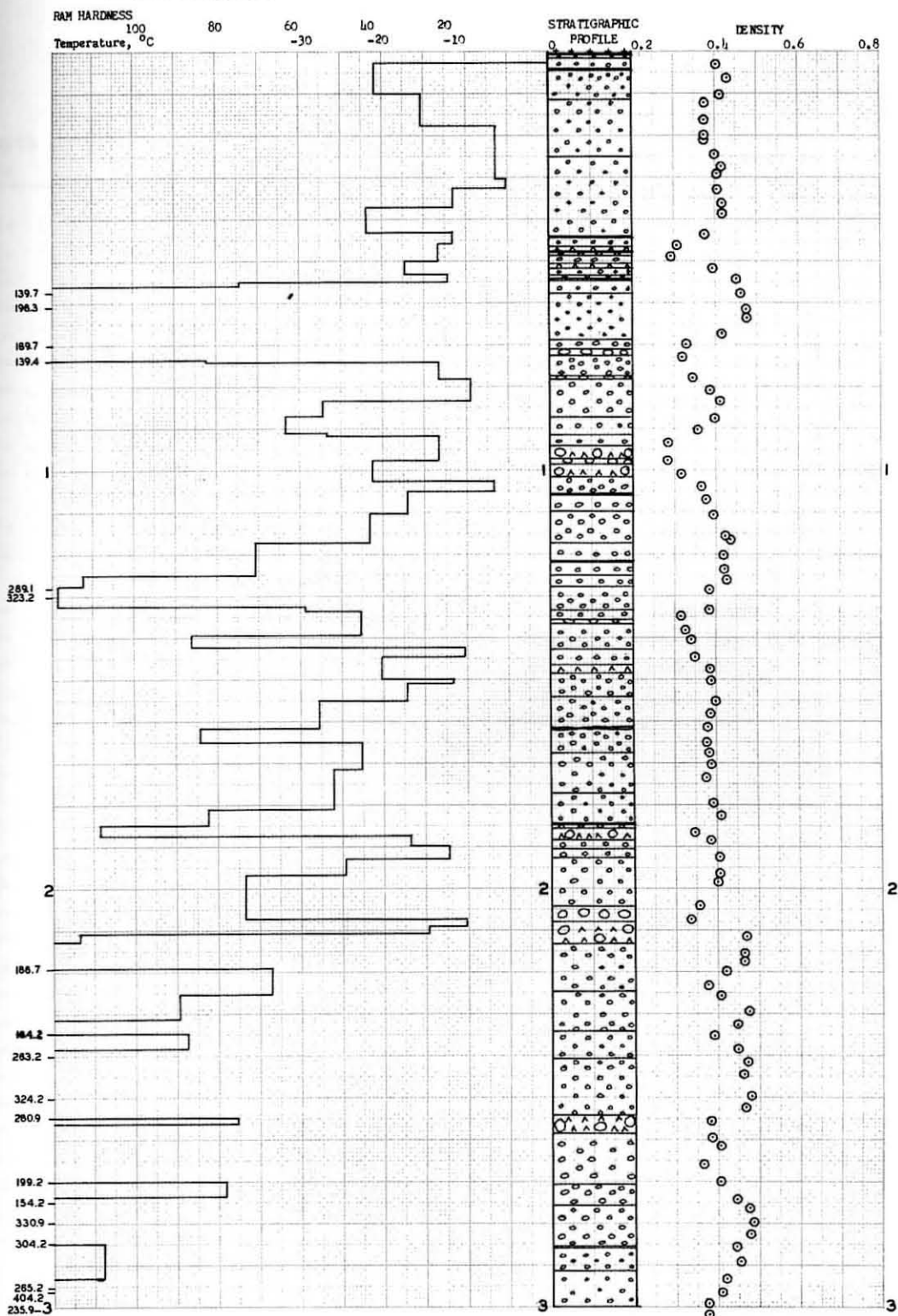


## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
110.4-119.8	65.9				
119.8-121.2	18.5				
121.2-127.8	14.8				
127.8-130.0	108.7				
130.0-131.0	364.2				
131.0-134.1	343.2				
134.1-142.6	139.6				
142.6-143.1	104.2				
143.1-150.7	96.4				
150.7-159.8	54.8				
159.8-160.3	44.2				
160.3-164.2	35.0				
164.2-167.9	85.3				
167.9-171.1	176.1				
171.1-180.0	302.1				
180.0-190.6	151.4				
190.6-191.0	104.2				
191.0-195.1	171.9				
195.1-197.5	170.8				
197.5-198.1	87.6				
198.1-200.0	46.3				

STATION Ross Ice Shelf  
 Traverse Site 13.0  
 DATE 6 December 1957  
 LOCATION 79°15'S  
 170°25'E  
 OBSERVER Boyd



Ross Ice Shelf Traverse  
 Station Site 13.0  
 Date 6 December 1957  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.3			New fallen snow; crust at bottom
0.3- 1.5	2.0-3.0		Cup shaped
1.5- 4.0	.3-.5/.1-.27.1	3:1	
4.0- 4.1			Crust
4.1- 11.6	.3-.5/.2-.6	4:1	
11.6- 25.0	.5/.2-.3-.6	2:1	
25.0- 44.1	.2-.3/.5-.7-.1	3:1	
44.1- 44.2			Layered crust
44.2- 44.8	.7-.6/.3-.5	3:1	Air space
44.8- 46.6	.5-.6-1.0/.2-.3	4:1	
46.6- 47.2	.8-1.1		Cup shaped
47.2- 47.6	.7-.9		Slightly cemented crust
47.6- 48.6	1.0-1.3/.7-1.0		Very loose grains, few cupped shaped
48.6- 50.3	.5-.7/.7-1.0	5:1	Slightly cemented
50.3- 51.5	1.3-1.6/1.0-1.3	3:1	Loose; needle and cup shaped
51.5- 53.2	.5-.3/.7	2:1	Slightly cemented
53.2- 53.9	.7-1.2		Loose
53.9- 54.0			Crust
54.0- 57.9	.5-.2-.3-.7/.8-1.0	3:1	
57.9- 68.9	.2-.3-.4/.5-.7	3:2	
68.9- 71.0	1.0-1.3/.8-1.5	5:1	
71.0- 72.7	1.3-1.5		Loose
72.7- 77.4	1.0-1.3-.7/1.5	4:1	
77.4- 78.1	1.8-3.1		Loose
78.1- 87.1	.7-1.0/1.0-1.3	3:1	
87.1- 91.4	1.2-1.5/.8-1.0	3:1	
91.4- 94.1	.8-1.0-1.3/1.5	2:1	
94.1- 97.2	2.0-3.7 o.c. 4.0		Loose cup shaped crystals
97.2- 98.3	1.5-2.3		Slightly cemented
98.3-101.5	1.8-2.5		Loose cup shaped crystals
101.5-105.3	1.1-1.3/.7-1.0	3:1	
105.3-105.4			Crust
105.4-109.8	1.2-1.3/1.0-1.5-.8	2:1	
109.8-117.2	1.0-1.3/.7-1.5	3:1	
117.2-121.6	.7-1.0/1.1-1.3	4:1	
121.6-121.7			Crust
121.7-125.0	1.1-1.3-1.5/.7-1.0-1.7	5:1	
125.0-127.8	.6-.8-1.0/1.1-1.3	3:1	
127.8-133.2	1.3-1.7/.8-1.1	3:2	
133.2-135.7	1.0-1.1/1.3-1.5-.7	3:1	
135.7-136.7	1.5-2.3		Air space; loose crystals

Ross Ice Shelf Traverse  
 Station Site 13.0  
 (Continued)

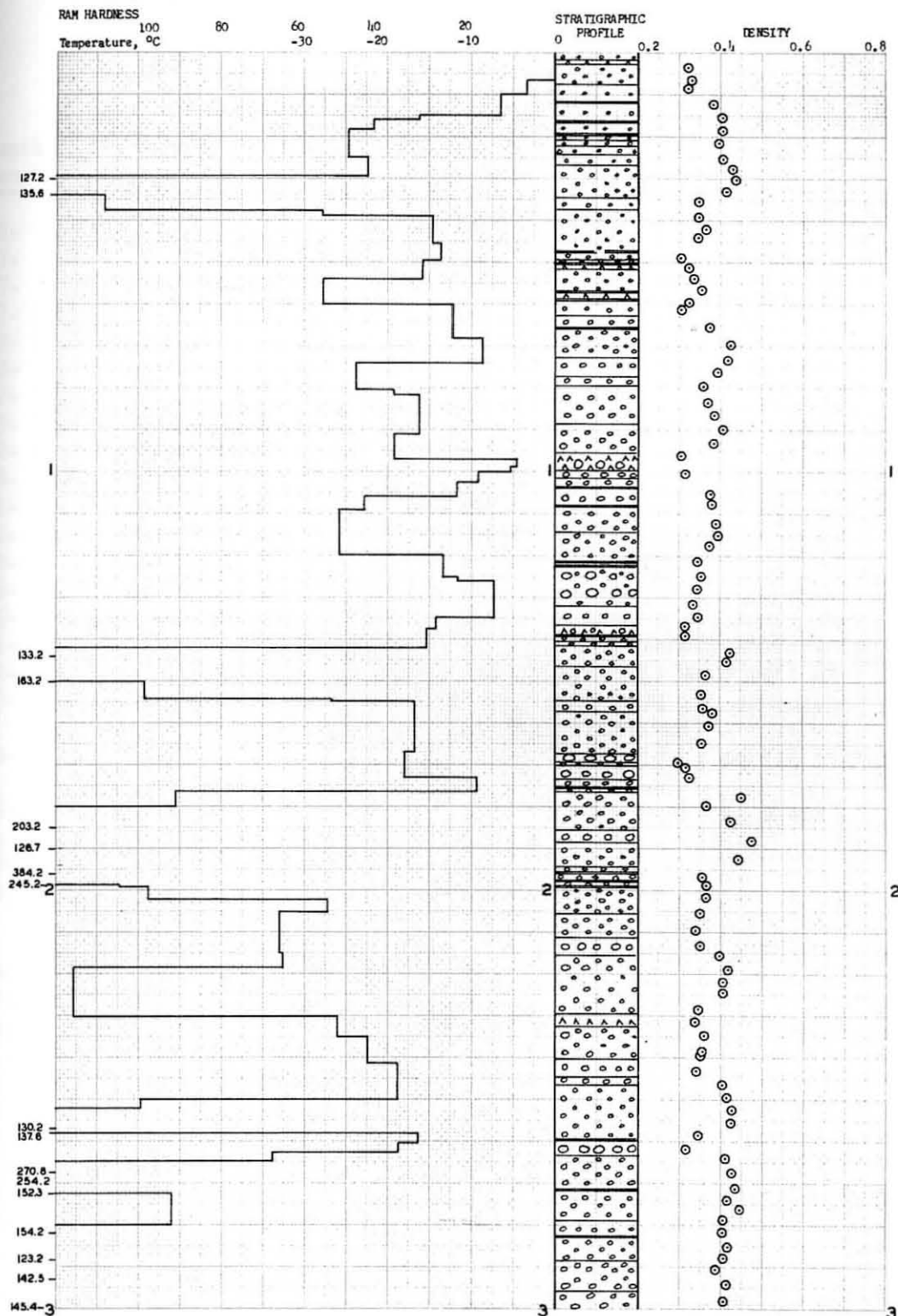
Depth cm	Grain Size	Ratio	Remarks
136.7-142.9	1.3-1.6/1.8-1.0 occ. .8	3:1	
142.9-146.3	1.5-2.0/1.0-1.3 occ. 2.0	4:1	
146.3-148.6	1.8-3.7 occ. 4.0		Loose crystals, air spaces and mostly cupped
148.6-154.1	1.3-1.5/1.0-1.3-.8	4:1	
154.1-161.4	1.0-1.4/1.5-1.8 occ. 1.0 occ. .7	3:1	
161.4-161.5			Crust; irregular in depth and wavy
161.5-167.6	1.3-1.5/1.0-1.3-1.7	3:1	
167.6-177.1	1.0-1.3/1.5-1.7-.8	2:1	
177.1-184.5	.8-1.0-1.2/1.5 occ. 1.7	3:1	
184.5-184.6			Crust
184.6-185.5	1.0-1.2/1.3-1.5	4:1	Slightly cemented
185.5-188.5	2.0-5.5/1.0-1.8	6:1	Loose cup shaped
188.5-190.4	.7-1.0-1.1/1.3 occ. 1.5	3:1	
190.4-192.5	1.1-1.3/1.0-1.5	3:2	
192.5-204.2	.7-1.0/1.0-1.3	4:1	
204.2-208.0	1.3-2.2		Loose
208.0-213.2	1.3-2.5/occ. 1.0		Loose, some cupped
213.2-224.7	.8-1.0/.5-1.2	3:1	
224.7-234.1	1.0-1.2-1.3/.7-1.5	2:1	
234.1-240.7	1.3-1.5/.5-.7-1.0	4:1	
240.7-254.2	.7-1.0/.5-1.2	5:1	
254.2-258.3	2.5-3.8/4.0-5.0	2:1	Large cup shaped crystals
258.3-270.6	1.0-1.3/1.3-1.5 occ. .8	2:1	
270.6-275.8	.7-.9/1.0-1.3	3:2	
275.8-285.6	.7-1.0/.5 and 1.2	3:1	Well cemented
285.6-285.7			Crust
285.7-291.2	1.0-1.3/.7 occ. 1.5	3:1	
291.2-300.0	1.3-1.5/.7-1.0	2:1	

# RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 13.4		174.4-177.0	50.4		
December 8, 1957		177.0-181.5	70.8		
0 - 4.8	3.4	181.5-182.9	21.4		
4.8- 7.8	23.2	182.9-190.3	409.7		
7.8- 16.3	25.5	190.3-191.6	219.4		
16.3- 20.7	30.5	191.6-193.4	137.5		
20.7- 24.1	32.6	193.4-194.0	54.2		
24.1- 24.7	36.6	194.0-198.0	49.2		
24.7- 33.4	30.8	198.0-200.0	79.2		
33.4- 33.8	78.2				
33.8- 36.8	83.2				
36.8- 37.3	63.2				
37.3- 46.0	44.6				
46.0- 46.5	63.2				
46.5- 50.0	60.4				
50.0- 58.6	56.8				
58.6- 59.5	25.4				
59.5- 70.0	32.7				
70.0- 75.1	42.4				
75.1- 77.1	68.2				
77.1- 82.6	90.4				
82.6- 84.1	23.2				
84.1- 85.1	23.2				
85.1- 90.1	19.2				
90.1- 95.1	25.2				
95.1- 97.0	51.6				
97.0-103.1	60.0				
103.1-110.1	85.6				
110.1-115.0	163.2				
115.0-119.3	202.0				
119.3-121.5	95.2				
121.5-122.3	66.6				
122.3-128.6	35.9				
128.6-137.7	50.4				
137.7-141.2	107.0				
141.2-142.8	23.0				
142.8-150.1	41.2				
150.1-152.1	64.2				
152.1-154.0	14.7				
154.0-159.3	18.4				
159.3-160.9	19.8				
160.9-161.9	39.2				
161.9-163.6	98.4				
163.6-166.0	187.6				
166.0-170.1	162.7				
170.1-173.7	70.8				
173.7-174.4	47.0				

STATION Ross Ice Shelf  
 Traverse Site 14.0  
 DATE 8 December 1957  
 LOCATION 79°55'S  
 170°20'E  
 OBSERVER Boyd



Ross Ice Shelf Traverse  
 Station Site 14.0  
 Date 8 December 1957  
 Observer Boyd

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.7	.2-.3/.1	3:2	
1.7- 2.7	.5-.7 occ. 1.0/.1	3:1	Needles and cupped crystals
2.7- 7.7	.3-.5/.1-.2-.7	2:1	
7.7- 11.9	.5-.7/.2-.3 occ. .1	2:1	Crust at bottom
11.9- 12.0			Crust
12.0- 16.2	.1-.2/.3-.5 occ. .7	3:1	
16.2- 16.3			Crust
16.3- 19.2	.3-.5-.7/.1-1.3	2:1	Very slight crust at 19.2
19.2- 20.8	.3-.6/.1-.2	4:1	
20.8- 22.1	.1-.2/.3-.5	3:1	
22.1- 24.2	.3-.5/.1-.7	3:1	
24.2- 26.9	.5-.7-.3/.1-.3	3:1	
26.9- 34.6	.1-.2/.1/.3	2:1	
34.6- 37.5	.2-.5/.1>.1	2:1	
37.5- 47.1	.3-.5-.6/.2-.7	2:1	
47.1- 47.2			Crust; mainly divided into two
47.2- 49.3	.5-.7/.2-.4	3:1	Layer has wavy outline
49.3- 50.0	.8-1.1		Loose and ice globules (sastrugi)
50.0- 50.5	.8-1.1		Crust; ice globules slightly cemented
50.5- 51.4	1.3-1.7/.7-1.0	2:1	Loose, some cup shaped
51.4- 56.9	.8-1.0/.3-.5-1.1	3:1	
56.9- 57.0			Crust
57.0- 58.9	1.5-2.6		Loose cup shaped crystals; very slight crust at bottom; layer may vary in width and depth
58.9- 62.8	1.3-1.1 occ. 1.5/.8-1.0	3:1	
62.8- 65.4	1.0-1.3/1.3-1.5-.7	4:1	
65.4- 65.5			Crust
65.5- 72.7	.7-1.0/1.0-1.2	3:1	Well packed
72.7- 77.1	1.0-1.4/.7-1.0-1.6	3:2	
77.1- 79.3	1.3-1.7/1.0-1.3-2.0	3:1	
79.3- 88.5	1.0-1.4/1.5-1.7	3:1	
88.5- 95.7	.7-1.0-1.3/1.5-1.7	4:1	
95.7- 99.8	2.5-4.3/1.8-2.5	4:1	Loose, air spaces, cup shaped
99.8-101.4	1.2-1.4/.8-1.0-1.6	3:1	
101.4-103.8	1.0-1.5/1.5-1.8 occ. .7-1.0	3:1	
103.8-103.9			Crust
103.9-108.0	.8-1.2/1.3-1.5	3:1	
108.0-108.1			Crust
108.1-114.6	1.1-1.3-1.6/.7-1.0-1.8	4:1	



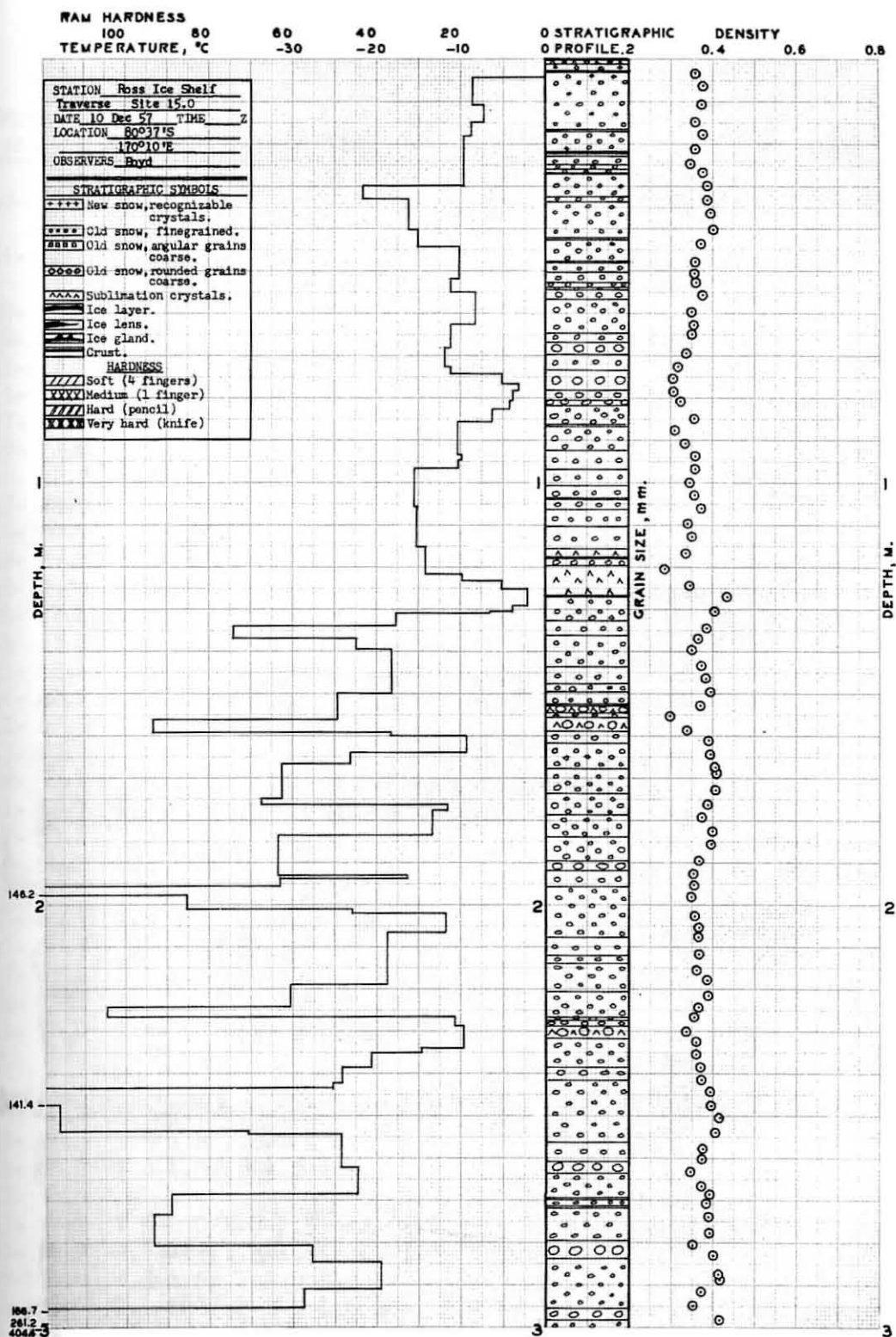
Ross Ice Shelf Traverse  
 Station Site 14.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
114.6-121.9	.7-1.0/1.0-1.5	3:1	Very slight crust at bottom
121.9-132.0	1.7-2.3/1.3-1.7-2.5	3:1	Crust at 122.5
132.0-136.6	.8-1.0/1.2-1.4 occ. 1.5	2:1	
136.6-139.0	1.8-3.1		Faint crust at 139.0; loose, some cupped, and air spaces
139.0-140.7	.7-1.0/1.1-1.3	4:1	
140.7-141.6	1.3-1.5/1.0-1.3	2:1	
141.6-146.7	.8-1.0/1.1-1.3	4:1	
146.7-154.8	1.3-1.5-1.7/1.0-1.3	4:1	
154.8-157.2	1.5-3.4/1.3-1.5	6:1	Loose
157.2-167.2	.8-1.0-1.2/1.5-1.8	3:1	
167.2-169.3	2.1-4.3		Loose
169.3-170.0	1.3-1.8		Cemented
170.0-173.4	1.8-4.1		Loose
173.4-175.1	.7-1.0/.5	4:1	Cemented, crust at bottom
175.1-175.2			Crust
175.2-176.3	1.0-1.3		
176.3-185.8	.5-.7-1.0/1.1-1.3	4:1	
185.8-188.6	1.3-1.6/1.0-1.3 occ. 2.0	6:1	
188.6-194.2	.7-1.0/.5-1.2	4:1	
194.2-195.5	1.3-1.6/.7-1.0	3:2	Slight crust at 195.5
195.5-197.6	1.3-1.7/.7-1.2	2:1	Slight crust at bottom
197.6-198.9	1.3-1.5/.7-1.1	3:1	Very slight crust at 198.9
198.9-205.6	.8-1.2/1.2-1.6	4:1	
205.6-211.3	1.1-1.3/.8-1.0-1.5	2:1	
211.3-215.3	1.3-1.7/.9-1.3-2.0	4:1	
215.3-229.3	.8-1.1/1.3-1.5	3:1	
229.6-232.7	2.1-4.3/1.3-2.0	3:1	Large loose crystals, cup shaped
232.7-240.2	.8-1.1/1.3 occ. 1.5		
240.2-244.6	1.4-2.1/1.0-1.3		
244.6-246.5	1.3-1.8/1.0-1.3-2.0		
246.5-259.7	.7-1.0/1.2 Very occ. 1.4	4:1	
259.7-263.2	2.3-4.7/1.5-2.0 occ. 5.0	4:1	Crust at top; several zones cemented
263.2-271.4	.7-1.0/.5-1.1	3:1	Loose grains in this layer
271.4-271.5			Crust
271.5-279.0	1.0-1.2/.5-.7-1.3	4:1	
279.0-282.6	1.2-1.4/.7-1.0	3:2	Slight crust at 282.6
282.6-288.4	1.1-1.3/.8-1.0	2:1	
288.4-295.8	1.3-1.7/1.0 Very occ. 2.0	4:1	Well packed
295.8-	1.5-1.7/1.0-1.3	3:2	Well packed

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 14.2		150.0-154.3	97.3	120.0-124.1	26.1
December 10, 1957		154.3-158.1	43.7	124.1-131.0	55.0
0 - 3.8	3.5	158.1-160.7	15.7	131.0-132.7	16.0
3.8- 5.5	32.6	160.7-162.9	13.3	132.7-134.8	11.3
5.5- 8.0	83.2	162.9-164.5	41.7	134.8-135.6	10.4
8.0- 11.3	63.8	164.5-167.4	121.4	135.6-136.2	20.9
11.3- 16.3	63.2	167.4-170.2	118.5	136.2-137.6	54.2
16.3- 26.2	39.6	170.2-171.0	54.2	137.6-139.4	159.7
26.2- 31.8	92.6	171.0-175.2	47.0	139.4-142.4	204.2
31.8- 35.4	58.8	175.2-181.7	41.2	142.4-149.3	108.6
35.4- 37.0	22.0	181.7-184.1	79.2	149.3-154.1	50.0
37.0- 39.1	89.0	184.1-187.5	101.3	154.1-156.8	48.7
39.1- 39.7	36.5	187.5-188.1	54.2	156.8-162.2	65.4
39.7- 45.9	37.1	188.1-190.1	79.2	162.2-163.5	27.3
45.9- 49.0	35.5	190.1-193.1	57.5	163.5-166.6	17.1
49.0- 50.2	28.2	193.1-193.8	32.8	166.6-168.8	22.4
50.2- 52.1	8.5	193.8-197.3	41.4	168.8-171.0	36.0
52.1- 54.8	5.1	197.3-199.9	100.4	171.0-178.9	54.8
54.8- 56.0	24.0	Station 14.4		178.9-183.4	26.4
56.0- 57.6	25.1	December 10, 1957		183.4-185.9	28.2
57.6- 63.6	18.2	0 - 8.7	3.3	185.9-187.8	46.3
63.6- 66.7	22.6	8.7- 12.4	16.7	187.8-189.0	104.2
66.7- 76.5	62.0	12.4- 18.5	37.6	189.0-192.2	110.4
76.5- 77.8	18.6	18.5- 19.0	23.2	192.2-196.0	91.2
77.8- 79.7	13.7	19.0- 23.6	20.6	196.0-199.9	96.6
79.7- 82.0	7.6	23.6- 30.4	25.3		
82.0- 84.8	12.1	30.4- 34.8	57.8		
84.8- 89.7	21.6	34.8- 41.5	133.0		
89.7- 93.0	33.5	41.5- 48.0	72.4		
93.0- 96.0	26.5	48.0- 50.1	50.9		
96.0-102.0	27.5	50.1- 58.1	25.7		
102.0-110.1	56.0	58.1- 65.7	16.4		
110.1-110.9	29.2	65.7- 67.8	15.1		
110.9-115.8	22.6	67.8- 69.8	28.2		
115.8-119.5	17.7	69.8- 73.0	43.8		
119.5-122.8	25.4	73.0- 76.3	51.7		
122.8-130.7	49.8	76.3- 77.0	31.8		
130.7-131.8	22.4	77.0- 82.1	18.9		
131.8-134.3	36.2	82.1- 83.5	10.3		
134.3-135.0	18.5	83.5- 85.2	6.1		
135.0-136.1	13.3	85.2- 89.3	8.1		
136.1-137.0	9.8	89.3- 93.6	14.8		
137.0-140.4	7.1	93.6- 97.6	39.2		
140.4-143.6	7.3	97.6-103.0	35.7		
143.6-144.6	19.2	103.0-108.1	31.7		
144.6-146.4	48.7	108.1-120.0	42.9		
146.4-150.0	131.8				



Ross Ice Shelf Traverse  
 Station Site 15.0  
 Date 10 December 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.1			Crust with a few scattered grains on top
0.1- 1.0	2.0-3.0		Thin, loose cupped crystals with air spaces
1.0- 2.6	.1-.1/.2	3:1	
2.6- 2.7			Crust
2.7- 3.1	.3-.5/.1-.2	2:1	
3.1- 16.7	.2-.3/.1-.5	3:2	Very slight crust at 16.7
16.7- 21.9	.5-.6/.2-.3	3:1	
21.9- 22.0			Crust
22.0- 22.7	.7-.8/.3-.5	2:1	Loose with air spaces
22.7- 22.8			Crust
22.8- 24.9	.3-.5/.1-.3 occ. .7	3:2	
24.9- 25.6	1.0-.7/.3-.6	4:1	Loose with air spaces
25.6- 26.6	.3-.5/.2-.7	3:1	Slight crust at 26.6
26.6- 32.4	.2-.3-.5/.1-.7	5:1	
32.4- 33.3	.5-.7/.3-.8	4:1	
33.3- 42.1	.5-.7/.3-.5 occ. 1.0	4:1	
42.1- 42.2			Crust
42.2- 47.5	.8-1.0/.3-.5	3:2	
47.5- 47.6			Crust
47.6- 50.1	.6-.7/.3-1.0	4:1	
50.1- 52.7	1.0-1.2/.7-1.0 Very occ. 1.5	3:1	
52.7- 53.8	.7-1.1		Slightly cemented zone
53.8- 54.2	1.3-1.8		Air spaces and loose grains
54.2- 56.5	.7-1.0/.5-.7 occ. 1.2	5:1	
56.5- 64.7	1.0 occ. 1.3/.8-1.0	3:2	
64.7- 66.7	.8-1.0/.5-.8-1.3	4:1	
66.7- 69.4	1.3-2.7/occ. 3.0	6:1	Loose
69.4- 73.1	1.0-1.3/1.3-1.5-.7-.8	3:1	
73.1- 78.0	1.8-3.7/Very occ. 4.0		Loose with air spaces; zones of cemented grains within layers
78.0- 80.2	1.3-1.7/1.0-1.3-2.0	5:1	
80.2- 81.4	1.5-1.8/2.0-3.1	2:1	Loose
81.4- 86.2	1.0-1.3/.8-1.0-1.5	3:1	
86.2- 86.3			Crust
86.3- 92.1	1.5-2.0/1.0-1.5 occ. 2.5	4:1	Loosely packed
92.1- 96.9	.8-1.2/1.3-1.5 occ. 1.7	3:1	
96.9-100.4	1.3-1.5/.7-1.0-1.3	2:1	
100.4-103.6	1.1-1.3/.8-1.0-1.6 occ. 2.0	2:1	Ice gland at bottom for 5 cm
103.6-106.1	1.0-1.3/.8-1.0 occ. 1.5	4:1	

Ross Ice Shelf Traverse  
Station Site 15.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
106.1-110.1	1.3-1.5/1.0-1.3 occ. 1.7	3:1	
110.1-115.6	.8-1.0-1.2/1.3-1.5	3:1	
115.6-117.3	1.2-1.7		Loose some cupped, offshoot of lower larger grains; very slight crust at 117.3; crust may become heavy ice layer .3 thick
117.3-119.3	.8-1.1/1.1-1.4 occ. .7	3:1	
119.3-126.9			Large loose grains and ice globules; 119.3-120.5 has cupped crystals 2.1-3.0; crust at 120.5; 120.5-126.9 is loose with 1.8-3.4 size grains
126.9-127.0			Crust
127.0-132.3	.7-1.1/1.3	2:1	
132.3-136.0	1.2-1.5/1.0-1.2	3:2	
136.0-143.4	1.3-1.7/1.0-1.3	3:2	
143.4-147.6	.8-1.0-1.3/1.5-1.7	4:1	
147.6-149.2	1.3-1.7/1.0-1.3-2.0	3:1	
149.2-152.6	.7-1.0/.5-1.3	4:1	
152.6-154.7	1.8-3.2/5.0	4:1	Loose with air spaces; cup shaped crystals
154.7-155.3			Slight crust of cemented 1.0- 1.5 grains
155.3-158.8	3.0-6.0/6.0-9.0	3:1	Approximate size of grains; loose cupped crystals
158.8-161.6	1.0-1.2/1.2-1.4; .7-.9	3:1	
161.6-167.9	1.3-1.4/1.0-1.2-1.5	2:1	
167.9-173.6	.7-1.0/1.0-1.3	3:2	
173.6-178.4	1.3-1.7/1.0-1.3-2.0	3:1	
178.4-183.8	1.2-.8/1.3-1.5	3:1	
183.8-189.5	.7-1.0/1.3 Very occ. 1.5	4:1	
189.5-191.8	1.3-1.8/1.8-2.1	3:1	Large loose grains
191.8-195.4	.5-.7/1.0 Very occ. 1.2	3:1	
195.4-195.7	1.0-1.5		Loose
195.7-207.7	.8-1.0/1.3	3:1	
207.7-207.8			Crust; crust of cemented .5- .8 grains
207.8-212.0	1.0-1.3-.8/1.5	5:1	
212.0-213.9	.8-1.0/.7-1.2	3:1	
213.9-220.4	1.1-1.3/.8-1.0-1.4	4:1	
220.4-226.5	.7-1.0/1.1-1.2	2:1	
226.5-227.1	1.0-1.3/1.5	3:1	
227.1-228.7	.7-1.0/1.2	2:1	
228.7-231.4	2.0-3.6		Cup shaped; loose with air spaces

Ross Ice Shelf Traverse  
 Station Site 15.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
231.4-238.3	1.1-1.3/1.3-1.5; .8-1.0	5:1	
238.3-241.4	1.3-1.6/1.0-1.3	3:1	
241.4-256.1	.7-1.0/1.0-1.4	4:1	
256.1-260.4	.8-1.1/1.1-1.3	3:1	
260.4-263.4	2.8-3.2/1.5	2:1	Loose
263.4-269.5	1.0-1.2/.8-1.5	3:1	Slight crust 269.5-269.6
269.5-271.2	.8-1.0/1.0-1.3-1.4	4:1	Crust from 271.2-272.3
271.2-279.6	1.1-1.4/.8-1.0	3:1	
279.6-283.4	2.3-3.8/occ. 4.0	4:1	Loose with air space
283.4-295.3	.7-1.0/.5-.7-1.2	3:1	
295.3-298.1	1.5-1.8/2.0; 1.0-1.3	4:1	Loose
298.1-300.0	.7-1.0/.5-1.2	3:1	Hard packed

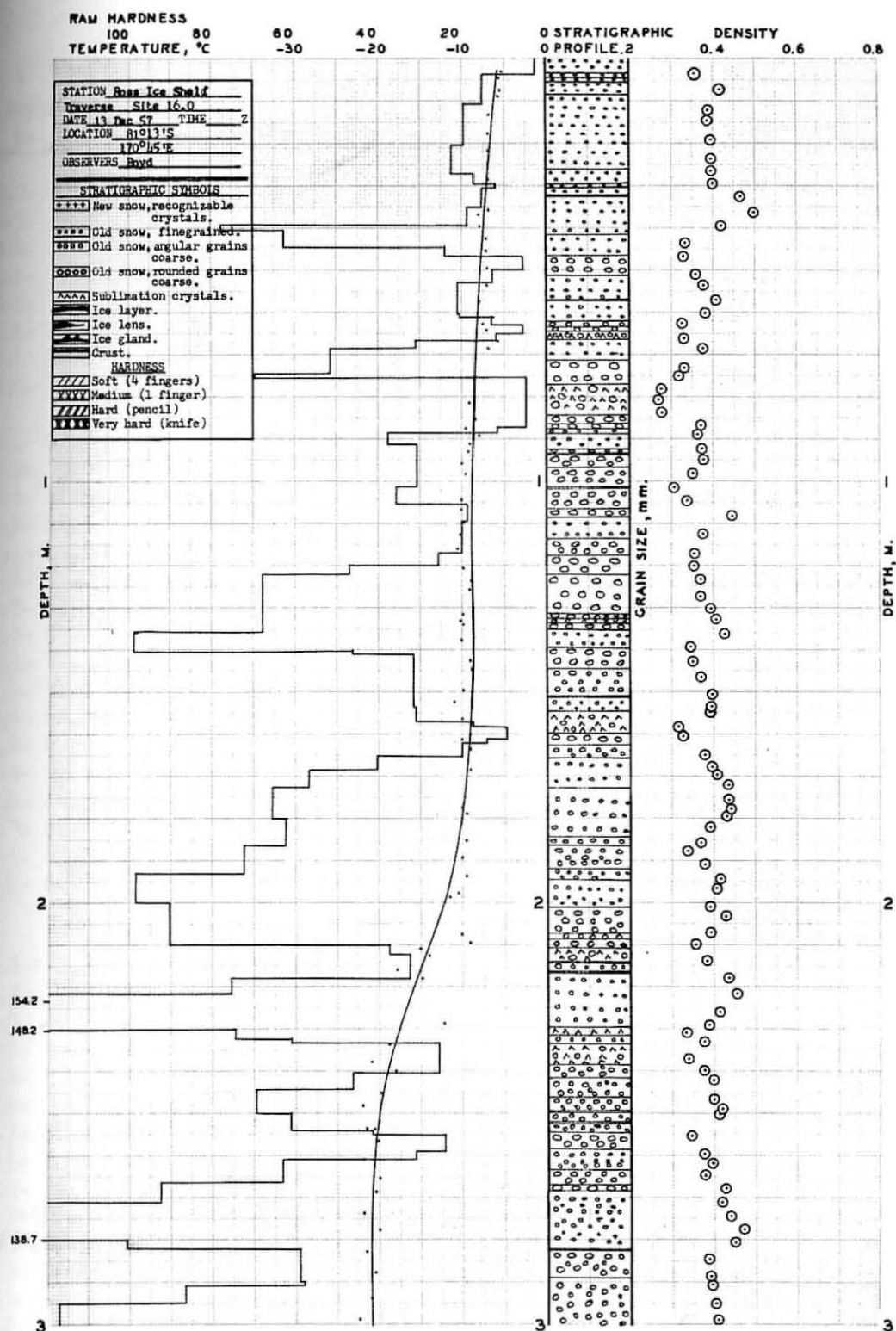
RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse

Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 15.2		179.4-180.1	61.4		
December 12, 1957		180.1-185.3	50.4		
0 - 12.1	3.3	185.3-186.1	29.2		
12.1- 15.0	20.5	186.1-189.8	17.7		
15.0- 16.1	48.8	189.8-191.5	39.5		
16.1- 20.3	27.0	191.5-193.0	97.6		
20.3- 21.1	3.3	193.0-195.1	75.6		
21.1- 26.0	15.5	195.1-196.3	45.9		
26.0- 33.4	27.5	196.3-199.5	16.7		
33.4- 36.7	39.6	199.5-200.0	24.2		
36.7- 39.2	35.2				
39.2- 40.1	25.4				
40.1- 45.4	31.5				
45.4- 46.6	8.8				
46.6- 48.6	13.2				
48.6- 50.2	22.0				
50.2- 55.0	26.1				
55.0- 60.1	46.3				
60.1- 69.1	41.0				
69.1- 70.3	19.9				
70.3- 73.7	23.8				
73.7- 78.3	22.8				
78.3- 79.0	31.8				
79.0- 80.4	60.5				
80.4- 85.7	76.8				
85.7- 86.4	46.0				
86.4- 95.0	43.9				
95.0- 99.0	39.2				
99.0-101.0	49.2				
101.0-109.0	69.2				
109.0-109.6	37.5				
109.6-115.3	37.6				
115.3-125.6	33.3				
125.6-128.2	50.4				
128.2-130.8	58.0				
130.8-131.6	29.2				
131.6-138.7	26.7				
138.7-144.0	34.4				
144.0-149.8	38.7				
149.8-150.3	24.2				
150.3-151.2	15.3				
151.2-153.2	9.2				
153.2-155.0	12.5				
155.0-160.2	23.5				
160.2-164.1	29.9				
164.1-170.5	53.4				
170.5-179.4	80.6				





Ross Ice Shelf Traverse  
 Station Site 16.0  
 Date 13 December 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.3	.1-.2/.3>.1	3:1	Slight crust at 0.3
0.3- 3.4	.3/.1-.1-.2	2:1	Very slight crust at 3.4
3.4- 4.6	.5/.1-.2-.3-.6	3:1	
4.6- 5.5	.2-.3/.1-.5	4:1	Crust at 5.5
5.5- 8.4	.3-.5/.1-.2	3:2	Crust at 8.4
8.4- 26.1	.5-.3/.1-.2>.1	3:2	
26.1- 29.6	.5-.6/.3-.2-.7	5:1	
29.6- 30.4	.5-.8		Air spaces and enlarged grains
30.4- 32.5	.3-.2/.5-.1	2:1	
32.5- 32.6			Crust
32.6- 41.5	.1-.2-.3/.5	3:1	Very hard packed
41.5- 42.1	.5-.3/.7-.2-.1	3:1	
42.1- 46.6	.5-.6/.7-.3	2:1	
46.6- 51.2	1.5-2.3/1.0-1.3		Loose with air spaces
51.2- 51.3			Crust
51.3- 57.1	.7-.8/.3-.5 Very occ. 1.0	2:1	
57.1- 57.4	.8-1.0		Enlarged grains
57.4- 57.5			Crust
57.5- 62.0	.5-.7/.8-.3	3:1	
62.0- 62.9	1.3-1.7		Enlarged grains
62.9- 63.4	1.0-1.3		Crust of cemented grains
63.4- 64.3	1.0-1.3		Crust of cemented grains
64.3- 64.5	1.5-2.1		Loose with air spaces
64.5- 65.2	1.0-1.3		Crust of cemented grains
65.2- 66.2	1.5-2.3		Enlarged grains; air space in center of layer; and some cupped grains
66.2- 71.3	.5-.7-1.0/.3-1.1	3:1	
71.3- 77.0	1.3-1.5/1.0-1.3-1.7	2:1	
77.0- 84.2	1.5-2.8/1.3-1.5-3.0	2:1	
84.2- 86.1	1.3-1.5/1.0-1.3	2:1	Slightly cemented
86.1- 87.5	1.8-3.1		Air spaces, enlarged grains
87.5- 88.7	.3-.5/.7-.2-.1	4:1	Cemented band
88.7- 92.1	1.0-.7/.3-.5-.7	3:1	
92.1- 93.4	1.0-1.3/.8-1.0	4:1	Crust at 93.4
93.4- 96.9	1.0-1.4/.8-1.5	2:1	
96.9-101.3	1.3-1.8/1.0-1.3	2:1	
101.3-106.3	1.3-1.7/2.0-2.3	3:1	
106.3-106.4			Crust
106.4-108.2	1.5-2.1		Loose
108.2-113.7	.8-1.1/1.3	3:1	Well packed
113.7-117.6	1.1-1.3/.8-1.3-1.5-2.0	2:1	

Ross Ice Shelf Traverse  
 Station Site 16.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
117.6-122.0	1.8-3.4/1.3-1.8	3:2	Slight crust at 122.0
122.0-131.3	1.3-1.7/1.0-1.3-2.0	2:1	
131.3-132.5	1.0-1.3/1.5-.8	2:1	
132.5-133.6	1.1-.8		Grains; cemented crust
133.6-135.0	1.3-1.7/1.8-2.0-.7	4:1	
135.0-139.5	.8-1.0/1.0-1.3-1.5	2:1	Very slight crust at 139.5
139.5-144.5	1.5-2.8/1.3-1.5-3.0	2:1	
144.5-151.3	1.0-1.4/1.6-1.8-2.0-.7	3:1	
151.3-151.4			Crust
151.4-154.9	.8-1.3/1.5	3:1	
154.9-159.9	2.5-4.0 occ. 5.0		Loose; air spaces, some cupped
159.9-162.3	1.3-1.5/.8-1.7 occ. 2.0	4:1	
162.3-165.7	1.0-1.4/.7-1.5-1.8	3:1	
165.7-172.9	.8-1.1-1.3/1.5-1.7	4:1	
172.9-184.1	1.0-1.3/.7-1.0-1.5	3:1	
184.1-186.2	1.0-1.4/1.5-1.7-.7-1.0	3:1	
186.2-191.8	1.3-1.7/.7-1.0 Very occ. 2.0	3:1	
191.8-194.2	1.0-.7/1.3	2:1	
194.2-201.1	.8-1.1/1.3	4:1	
201.1-207.8	1.5-2.3/1.0-1.3	3:1	Loose, air spaces
207.8-208.7	1.0-1.2-.8/1.3-1.5	3:1	
208.7-210.7	1.3-1.6/1.7-1.8-.7-1.0	3:1	
210.7-214.3	1.5-2.2		Loose; some cupped; crust at 214.3
214.3-216.4	1.0-1.4/.7-1.5-1.8 occ. 2.0	3:1	Crust at 216.4
216.4-229.5	.7-1.1/1.1-1.3 occ. 1.5	5:1	
229.5-231.5	1.8-3.2		Loose with air spaces; some cup shaped
231.5-233.1	.8-1.1/1.3	3:1	Slight cemented grains; crust between two grain layer
233.1-238.2	2.3-5.1		Loose, some cup shaped
238.2-241.7	1.3-1.8/1.0-1.3; 2.0-2.3	4:1	
241.7-246.0	1.0-1.3/.7-1.0-1.3-1.5	4:1	
246.0-249.4	1.3-1.1/1.5-1.0-.7-1.7	5:1	Crust at 249.4
249.4-252.5	1.3-1.5-1.7/1.0-1.3-2.0	6:1	Crust at 252.5
252.5-254.3	1.0-1.3/.7-1.0 occ. 1.4	3:1	Slightly cemented
254.3-258.5	1.8-3.4/4.0-4.5	5:1	Loose
258.5-263.6	1.0-1.3-.7/1.5	3:1	
263.6-266.9	1.3-1.5/1.0-1.3-7	3:1	
266.9-268.2	1.5-1.7/1.3-1.5	2:1	Loose with air spaces
268.2-282.5	1.3-1.1/1.4-1.0-.8	3:1	Slight crust at bottom
282.5-289.0	1.3-1.6/1.0-1.3	2:1	
289.0	1.0-1.4/.7-1.0-1.5	2:1	

# RAM HARDNESS DATA SHEET

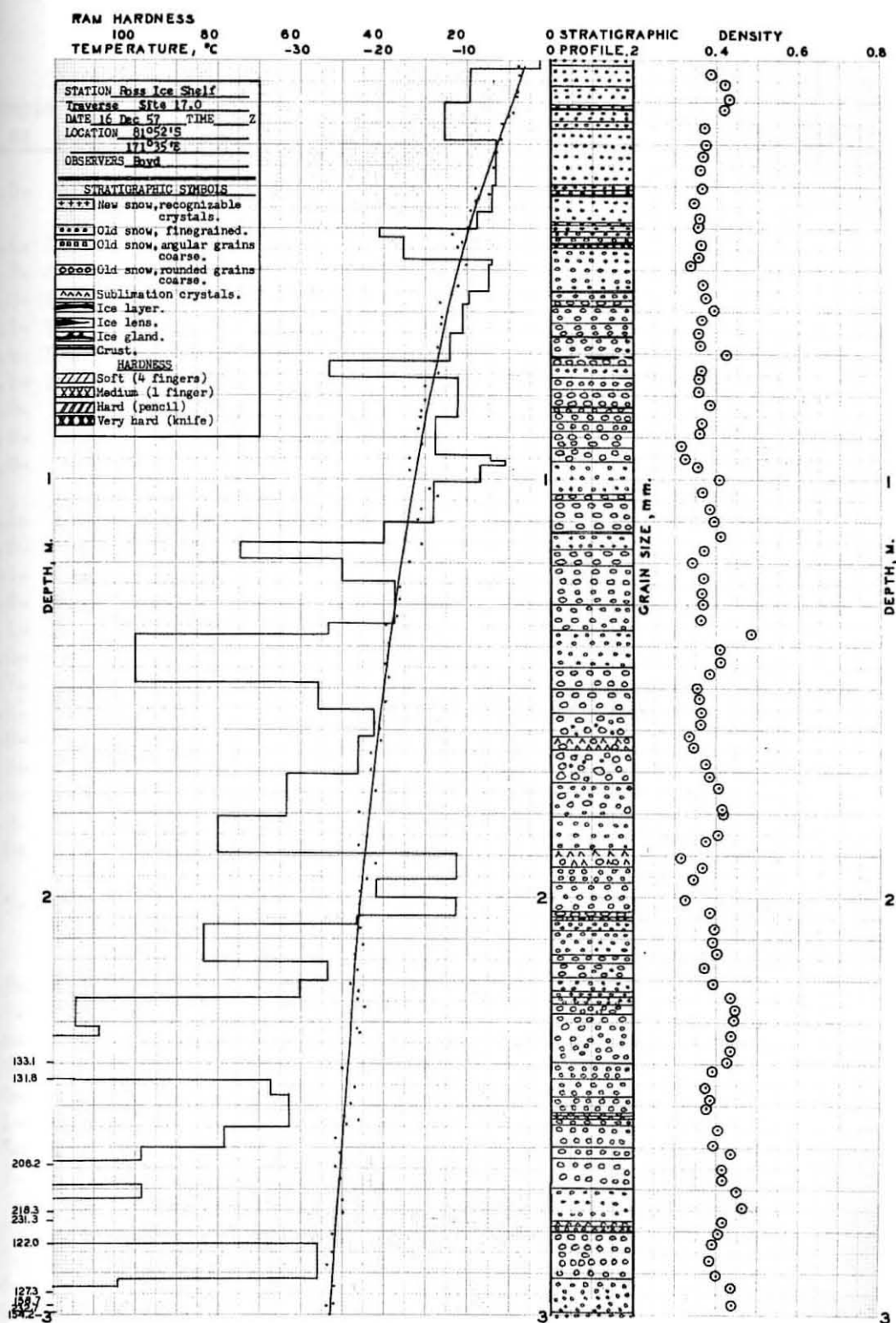
Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 16.2		137.0-138.6	160.7	100.9-105.0	5.6
December 16, 1957		138.6-140.8	72.4	105.0-107.1	6.6
0 - 4.1	3.4	140.8-141.5	47.0	107.1-107.3	29.2
4.1- 10.0	17.6	141.5-142.8	11.9	107.3-108.0	90.0
10.0- 18.1	14.3	142.8-144.5	13.0	108.0-110.7	126.5
18.1- 20.1	8.2	144.5-147.1	8.1	110.7-111.3	54.2
20.1- 24.4	4.4	147.1-149.0	12.1	111.3-113.8	20.2
24.4- 26.0	15.7	149.0-150.8	20.9	113.8-116.4	10.0
26.0- 29.2	25.1	150.8-154.0	24.3	116.4-119.1	26.4
29.2- 29.7	13.2	154.0-156.9	45.6	119.1-123.1	34.2
29.7- 30.4	17.5	156.9-157.4	44.2	123.1-125.4	82.4
30.4- 31.4	10.3	157.4-160.8	16.0	125.4-130.0	232.3
31.4- 33.8	11.5	160.8-165.3	15.3	130.0-136.0	237.3
33.8- 35.8	48.2	165.3-169.5	23.3	136.0-140.2	290.2
35.8- 36.0	253.2	169.5-175.0	31.5	140.2-143.1	176.7
36.0- 38.2	48.7	175.0-179.8	50.0	143.1-150.3	122.3
38.2- 40.4	25.9	179.8-184.3	93.0	150.3-155.7	137.5
40.4- 43.0	18.6	184.3-186.5	76.8	155.7-160.5	104.2
43.0- 46.7	38.3	186.5-194.2	48.4	160.5-164.2	52.8
46.7- 47.1	28.2	194.2-200.0	118.0	164.2-170.0	40.4
47.1- 50.2	25.8			170.0-176.5	28.8
50.2- 50.7	23.2	Station 16.4		176.5-182.1	64.8
50.7- 55.8	16.9	December 16, 1957		182.1-187.2	67.0
55.8- 60.8	19.2	0 - 3.7	3.5	187.2-190.1	18.0
60.8- 62.5	9.1	3.7- 7.8	14.2	190.1-191.0	26.4
62.5- 64.8	9.7	7.8- 10.9	16.1	191.0-195.9	18.5
64.8- 70.8	13.2	10.9- 20.4	20.1	195.9-199.8	29.8
70.8- 75.0	27.0	20.4- 25.3	13.4	199.8-200.0	54.2
75.0- 79.9	23.6	25.3- 26.5	11.5		
79.9- 83.8	13.5	26.5- 30.8	14.8	Station 16.6	
83.8- 84.6	15.7	30.8- 39.6	19.1	December 16, 1957	
84.6- 86.5	14.3	39.6- 45.7	16.3	0 - 4.8	3.4
86.5- 88.0	6.5	45.7- 46.0	36.5	4.8- 10.2	18.0
88.0- 89.8	6.0	46.0- 48.1	79.4	10.2- 14.1	23.7
89.8- 92.5	10.6	48.1- 51.5	47.4	14.1- 16.8	24.4
92.5- 95.1	34.0	51.5- 55.0	31.8	16.8- 23.6	16.5
95.1-100.9	35.2	55.0- 55.6	36.5	23.6- 24.9	10.9
100.9-105.1	20.9	55.6- 59.4	16.4	24.9- 29.4	12.1
105.1-110.1	32.2	59.4- 62.8	10.6	29.4- 34.2	24.0
110.1-112.0	25.3	62.8- 74.7	15.8	34.2- 35.2	13.2
112.0-121.4	20.9	74.7- 76.8	17.5	35.2- 39.6	28.2
121.4-124.5	23.6	76.8- 80.2	41.4	39.6- 43.0	32.6
124.5-125.0	64.2	80.2- 90.2	28.2	43.0- 48.7	27.8
125.0-129.7	93.6	90.2- 92.2	23.2	48.7- 50.1	60.4
129.7-130.1	79.2	92.2- 94.6	33.4	50.1- 54.9	40.7
130.1-135.0	32.8	94.6- 99.4	27.1	54.9- 59.5	20.6
135.0-137.0	139.2	99.4-100.9	10.9	59.5- 61.5	13.2

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf TraverseObservers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
61.5-69.5	9.5				
69.5-73.3	15.1				
73.3-83.5	21.8				
83.5-90.2	15.2				
90.2-92.0	8.8				
92.0-95.1	6.4				
95.1-96.6	13.2				
96.6-97.0	41.7				
97.0-105.2	44.6				
105.2-110.8	29.2				
110.8-117.5	31.1				
117.5-123.0	29.7				
123.0-123.7	18.5				
123.7-127.0	19.4				
127.0-128.0	54.2				
128.0-133.0	88.2				
133.0-135.5	52.2				
135.5-138.7	23.0				
138.7-139.0	69.8				
139.0-140.5	104.2				
140.5-145.6	141.4				
145.6-146.1	104.2				
146.1-150.0	50.4				
150.0-164.8	32.6				
164.8-165.7	26.4				
165.7-168.9	13.6				
168.9-171.5	13.8				
171.5-174.9	48.4				
174.9-177.1	58.8				
177.1-179.1	24.2				
179.1-180.5	18.5				
180.5-183.8	20.9				
183.8-190.5	28.0				
190.5-194.1	51.4				
194.1-200.0	43.2				



Ross Ice Shelf Traverse  
 Station Site 17.0  
 Date 16 December 1957  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 6.2	.2-.3/.1>.1	2:1	Crust <del>on</del> top; very slight crust at 6.2
6.2- 10.7	.3-.5/.2-.1	3:1	Very slight crust at 10.7
10.7- 11.0	.5-.7		Slightly enlarged grains
11.0- 11.1			Crust
11.1- 14.4	.1-.2/.3 occ. .5	3:1	Slight crust at 14.4
14.4- 16.2	.3-.5/.1-.2-.6	3:1	
16.2- 29.8	.3-.5/.1-.2-.6 occ. .7	2:1	
29.8- 31.0	.2-.3/.1-.5	3:1	
31.0- 32.0	.5-.7/.3-.5		Occasionally pieces of ice
32.0- 32.1			Crust occasionally divided into two
32.1- 38.6	.2-.3-.1/.3-.5	2:1	Crust at bottom
38.6- 39.1	.5-.7/.3-.5	3:1	
39.1- 40.8	.3-.5/.2-.6	2:1	
40.8- 42.1	.5-.3/.8-.6	2:1	
42.1- 43.6	1.0-.7/.3-.5-1.1	2:1	
43.6- 43.7			Crust
43.7- 44.4	.5-.8		Slightly cemented grains
44.4- 55.0	1.0-1.3/.8-1.0 occ. 1.5	3:1	Crust at 55.0-55.1
55.0- 57.2	1.1-1.4/.8-1.0-1.6	3:1	
57.2- 58.6	1.3-1.5/.8-1.0-1.3	2:1	Crust at 58.6-58.7
58.6- 62.9	1.0-1.2-.8/1.3-1.5-1.6	4:1	
62.9- 66.0	1.3-1.6/1.0-1.3 occ. 1.7	5:1	Crust at 66.0-66.1
66.0- 70.5	1.2-1.4/.7-.8-1.5	3:1	Very irregular in width and depth
70.5- 72.9			Upper--sometimes heavy ice; crust 2.0-3.0 mm; lower bounded by ice crust
72.9- 75.7	1.3-1.6/1.1-1.3 occ. 1.7	3:1	
75.7- 78.6	1.2-1.4/1.0-1.2-1.5	3:1	
78.6- 82.5	1.5-2.1/1.3-1.5 occ. 2.3	4:1	Crust 82.5-82.6
82.5- 84.0	1.3-1.8/1.0-1.3-2.0-2.2	4:1	
84.0- 86.1	1.0-1.3/1.3-1.5	4:1	
86.1- 88.5	1.3-1.6/.8-1.0	3:1	
88.5- 92.7	1.5-2.0/1.0-1.3	4:1	
92.7- 95.7	1.8-2.4		Loose; slight crust at 95.7
95.7-103.6	.8-1.1/1.1-1.3	5:1	
103.6-104.8	1.4-1.7/1.1-1.3	3:1	
104.8-112.6	1.3-1.5/.8-1.5-1.7-1.0-1.3	3:1	
112.6-112.7			Crust
112.7-116.9	.8-1.0/1.1-1.3	4:1	
116.9-120.6	1.4-1.8/1.8-2.1	3:1	Loose



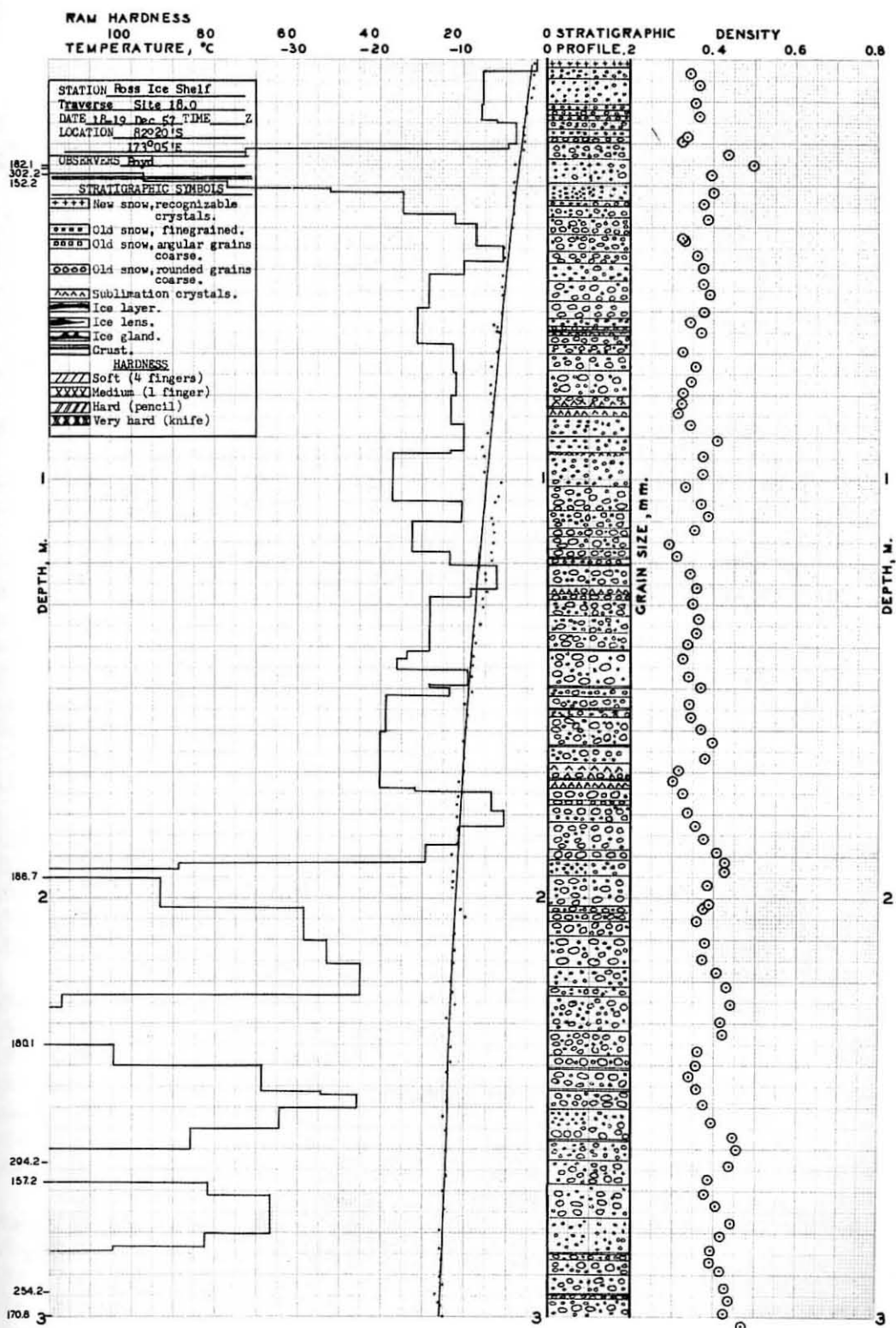
Ross Ice Shelf Traverse  
 Station Site 17.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
120.6-130.0	1.1-1.3/.8-1.0-1.5	3:1	
130.0-136.0	1.0-1.4/.7-1.0-1.5	3:1	Very slight crust at 136.0
136.0-145.1	.8-1.0/1.1-1.3	4:1	Very slight crust at 145.1
145.1-150.3	1.3-1.6/1.6-2.1 occ. .7	3:1	
150.3-155.9	1.5-2.1/1.3-1.5-2.1-2.4	3:1	
155.9-161.5	1.5-1.8/.8-1.1-2.0-2.3	2:1	
161.5-164.8	2.3-4.4		Some cupped shaped and loose
164.8-172.6	1.3-1.6/1.0-1.3 occ. .7	3:1	
172.6-180.7	.8-1.1/1.1-1.3 occ. 1.5	3:1	
180.7-188.3	.8-1.2/1.2-1.5	4:1	
188.3-192.8	2.4-4.3		Loose; mostly cupped and slight cemented zone
192.8-196.3	1.0-1.4/1.6-.7	3:1	In layer same size grains
196.3-196.8	1.2-1.4		Enlarged grains
196.8-203.1	1.0-1.5/1.5-2.1 occ. 2.8	3:1	
203.1-204.8	2.3-4.4/1.3-1.8		Loose grains
204.8-205.2	2.3-4.0/1.0-1.5		Cemented; crust from 204.8- 204.9
205.2-208.1	.7-1.0/1.1-1.3	2:1	Crust from 205.2-205.3
208.1-213.8	1.1-1.4/.7-1.0-1.5	3:1	
213.8-215.7	1.3-1.5/.7-1.0-1.7	5:1	
215.7-219.3	1.4-1.7/1.0-1.3	2:1	
219.3-222.4	.8-1.0/.6-.7-1.1	3:1	
222.4-223.9	1.0-1.2/.7-1.0-1.3	3:1	
223.9-225.8	.7-1.0/.6-1.1	2:1	
225.8-227.9	1.3-1.5/1.0-1.3	2:1	
227.9-239.8	.8-1.0/1.3-.6	2:1	Slight crust at 239.8
239.8-243.3	1.0-1.4/1.5-.8	2:1	Slight crust at 243.3
243.3-247.9	1.3-1.7/1.0-1.2-1.8	3:1	
247.9-251.5	1.2-1.4/.7-1.0-1.2	3:1	
251.5-252.0	1.3-1.7		Enlarged grains
252.0-253.3	.8-1.0/1.2-.6	3:1	
253.3-254.5	1.1-1.4/.8-1.5-1.7	3:1	Irregular in depth, wavy out- line
254.5-259.8	1.0-1.2/1.4-.7	4:1	
259.8-262.3	1.3-1.6/1.0-1.3-1.8	4:1	Slight crust at 262.3
262.3-269.7	1.0-1.3/.7-1.0	2:1	
269.7-277.5	.7-1.0/.5-1.1	3:1	Well packed
277.5-278.7	1.8-3.2		Loose with air spaces--some cupped
278.7-280.0	.5-1.0		Cemented grains
280.0-280.1			Crust
280.1-291.1	1.2-1.6/1.0-1.2 occ. 2.0	3:2	
291.1-299.2	.6-.8/.8-1.0	3:2	Well packed
299.2-299.3			Crust
299.3	.8-1.0/1.0-1.2	3:1	

## RAM HARDNESS DATA SHEET

 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 17.2		163.2-167.3	48.0		
December 18, 1957		167.3-170.5	54.2		
0 - 3.6	3.5	170.5-180.0	29.5		
3.6- 5.5	19.0	180.0-182.3	56.4		
5.5- 8.2	32.8	182.3-183.5	29.2		
8.2- 8.9	17.5	183.5-187.0	35.6		
8.9- 10.5	15.7	187.0-199.6	58.2		
10.5- 12.1	22.0				
12.1- 19.1	34.6				
19.1- 25.4	23.8				
25.4- 26.7	26.3				
26.7- 33.1	28.2				
33.1- 39.5	17.3				
39.5- 43.5	20.7				
43.5- 45.8	33.6				
45.8- 46.2	28.2				
46.2- 49.4	15.7				
49.4- 51.2	8.8				
51.2- 52.7	13.2				
52.7- 56.5	24.3				
56.5- 64.8	24.9				
64.8- 69.1	49.7				
69.1- 70.5	46.1				
70.5- 72.4	19.0				
72.4- 76.5	10.5				
76.5- 83.7	10.2				
83.7- 84.2	13.2				
84.2- 86.5	24.9				
86.5- 88.0	83.2				
88.0- 90.3	111.9				
90.3- 91.0	74.6				
91.0- 94.6	53.2				
94.6- 97.8	40.7				
97.8- 99.1	58.0				
99.1-105.1	54.2				
105.1-110.5	33.8				
110.5-114.1	51.4				
114.1-124.1	73.2				
124.1-127.5	110.1				
127.5-129.6	123.2				
129.6-140.3	82.1				
140.3-144.6	78.6				
144.6-145.4	54.2				
145.4-150.5	39.5				
150.5-152.8	34.6				
152.8-158.9	56.6				
158.9-163.2	60.0				



Ross Ice Shelf Traverse  
 Station Site 18.0  
 Date 18-19 December 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.2	.3 to .4/.1-.2	3:2	Loose snow on surface
0.2- 1.8	.2-.1/.3	4:1	Crust at .2
1.8- 4.6	.3-.5-.7/.1-.2	3:1	Loose; crust at 1.8
4.6- 10.8	.3-.5-.2/.1	4:1	Crust at 4.6
10.8- 11.9	.5-.7/.3-.8	2:1	Area of loose grains
11.9- 13.1	.2-.3/.1-.5	3:1	
13.1- 13.3	.5-.7/1.0	3:1	Area of loose grains
13.3- 14.6	.3-.5/.2	4:1	
14.6- 16.4	.7-1.0/.3-.5	3:1	Loose grains; crust at 16.4
16.4- 18.6	.2-.3/.5	3:1	Crust at 18.6
18.6- 19.8	1.0-1.1/.5-.7	4:1	Crust at 19.8; loose grains
19.8- 23.6	1.0-1.2/.5-.8-1.3	4:1	Loose grains
23.6- 29.2	.2-.3/.1	3:1	Cemented or wind slab
29.2- 33.4	.3-.5/.7	2:1	
33.4- 34.9	1.0/.5-.7	3:2	Slight crust at 34.9
34.9- 37.5	.7-.5/.3-1.0	3:1	Slight crust at 37.5
37.5- 41.4	1.0-1.2/.5-.8-.3	4:1	Crust from 41.4-41.5
41.4- 45.7	1.5-2.1/1.3-1.5-2.4	3:1	Slight crust at 45.7
45.7- 48.3	1.0-1.3/.7-1.5	4:1	Slight crust at 48.3
48.3- 52.7	.7-1.2/1.4	3:1	
52.7- 57.3	.8-1.0/1.0-1.5	5:1	
57.3- 57.9	1.0-1.4		Zone of enlarged grains
57.9- 61.6	.8-1.0/.6-1.2	3:1	
61.6- 63.7	1.0-1.3/.7-1.5	4:1	
63.7- 64.1	1.2-1.4/1.5	3:1	Zone of enlarged grains
64.1- 64.9	.8-1.1		Hard crust, wind slab or cemented .8-1.1
64.9- 65.5	1.3-1.6/1.8-2.0	4:1	Loose grains on top
65.5- 67.9	.7-1.0/1.0-1.3 Very occ. 1.7	5:1	
67.9- 70.2	1.0-1.3/.8-1.0-1.5	3:1	
70.2- 74.0	.8-1.0/1.3-1.6	4:1	
74.0- 80.2	1.3-1.5/1.0-1.3	3:1	
80.2- 82.8	1.5-1.7/1.3-1.5	3:1	Loose grains
82.8- 83.0	1.0-1.3/1.5	2:1	Crust with cemented grains
83.0- 85.3	1.5-2.6/3.0	4:1	Loose, cup shaped
85.3- 89.9	.7-1.1/1.1-1.3-.5	3:1	
89.9- 93.1	.7-1.0/1.1	3:1	Hard packed
93.1- 93.5	1.3-1.5		Loose grain zone
93.5-101.5	.8-1.0/.6-1.2	4:1	Crust at 101.5

Ross Ice Shelf Traverse  
Site 18.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
101.5-107.1	1.3-1.5/1.7 occ. 2.0	4:1	Slight crust 107.1
107.1-111.6	1.0-1.3/.7-1.0-1.5	3:1	
111.6-113.4	1.5-2.2/1.3-1.5	2:1	
113.4-116.5	1.2-1.4/1.0-1.2-1.6	5:1	
116.5-118.4	1.8-3.1		Loose
118.4-118.5			Crust
118.5-120.1	1.2-1.5/.8-1.1	3:1	Slight crust at 120.1
120.1-125.2	1.4-1.8/.7-.9-1.0-1.3	4:1	
125.2-127.1	2.1-3.5/1.5-2.0	3:1	Many cup shaped; air spaces
127.1-128.9	1.0-1.3/.8-1.5-1.7	2:1	
128.9-132.3	1.3-1.7/1.0-1.3-2.0	4:1	Crust at 132.3-132.4
132.3-136.4	.7-1.1/1.1-1.4 occ. 1.6	3:1	
136.4-140.4	1.2-1.6/.8-1.0	3:1	
140.4-140.5			Crust
140.5-149.6	1.3-1.8/2.0 occ. 1.0	3:1	
149.6-149.7			Crust
149.7-151.8	1.0-.7/1.2	3:1	
151.8-154.5	1.3-1.5/1.0-1.3-1.7	2:1	
154.5-154.6			Crust
154.6-156.5	1.4-1.7/.7-1.0-1.2	3:2	
156.5-163.1	1.5-2.0/1.3-1.5 occ. .7-1.0	3:1	
163.1-163.2			Crust
163.2-167.6	.8-1.1/1.3-1.5	4:1	
167.6-171.3	1.5-3.2/4.5 occ. 4.0	3:1	Loose; some cup shaped
171.3-171.5			Crust of cemented grains
171.5-173.8	5.0-8.0/1.3-1.5	6:1	Air spaces, some cemented
173.8-176.5	1.8-2.5/2.6-3.2	4:1	Loose
176.5-177.8	3.0-4.8/5.0	5:1	Loose
177.8-181.7	1.3-1.6/1.0-1.3-1.8	2:1	
181.7-188.1	1.2-1.4/1.0-1.2-1.6	3:1	
188.1-190.9	1.5-2.3/2.5-3.0	5:1	Crust at top
190.9-194.6	.7-1.0/.5-1.2	3:1	Wind slab of cemented grains
194.6-201.9	1.3-1.5/1.0-1.3-1.7	5:1	
201.9-203.3	1.1-1.3/.8-1.4	2:1	
203.3-205.5	1.3-1.5/1.0-.7	2:1	
205.5-209.0	1.3-1.7/1.0-1.3	2:1	
209.0-216.6	1.0-1.3/1.3-1.5-1.7 occ. .7	4:1	
216.6-221.1	.7-1.1/1.1-1.4	3:1	
221.1-223.2	.7-1.0/1.2-1.4	6:1	
223.2-231.8	.6-.8/1.0-1.2	3:1	
231.8-237.5	1.0-1.4/.8-1.0-1.5	3:1	Slight crust at 231.8
237.5-240.6	1.3-1.6/1.8-1.0	3:1	
240.6-240.7			Crust
240.7-245.4	1.5-1.8/1.3-1.5	2:1	
245.4-245.5			Crust
245.5-250.1	1.2-1.4/.8-1.0-1.2-.7	3:1	

Ross Ice Shelf Traverse  
 Station Site 18.0  
 (Continued)

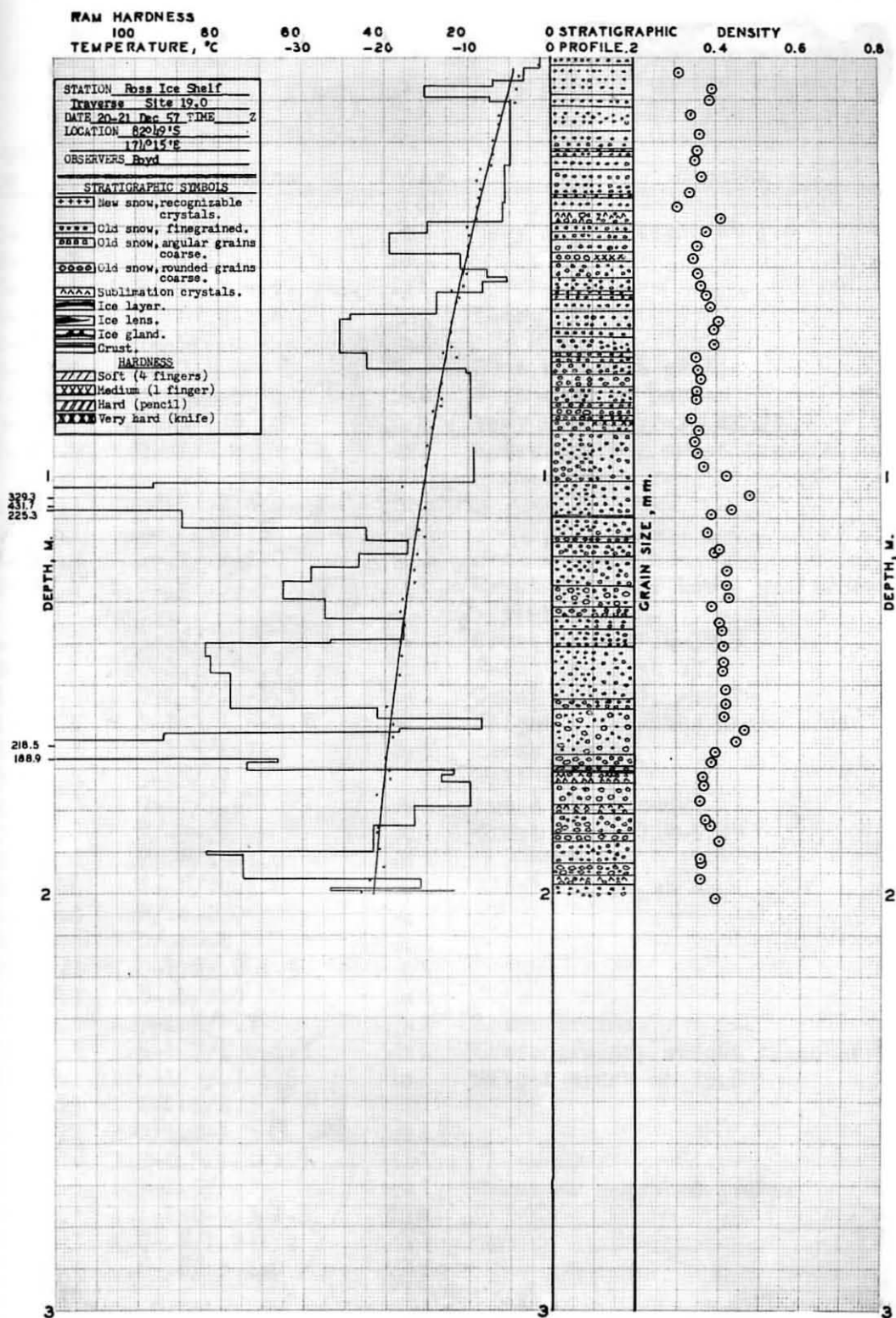
Depth cm	Grain Size	Ratio	Remarks
250.1-257.6	.8-1.1/1.1-1.3 occ. 1.5	4:1	
257.6-257.7			Crust
257.7-262.8	.7-1.0/1.0-1.2	3:1	Slight crust at 262.8
262.8-268.1	.8-1.2/1.3 occ. 1.5	5:1	
268.1-276.3	1.0-1.4/.8-1.0	3:1	
276.3-284.7	.7-1.0/1.2	4:1	Wind slab
284.7-286.3	1.3-1.6/1.0-1.3-1.8	3:1	
286.3-289.9	1.1-1.4/1.0-1.4-1.7	3:1	
289.9-294.2	.8-1.0/1.1-1.3	3:1	
294.2-294.3			Crust
294.3-295.2	1.2-1.4/1.4-1.7 occ. .8	3:1	
295.2-295.3			Crust
295.3-300.0	.8-1.0/1.1-1.3	4:1	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 18.2		116.1-116.8	18.5		
December 19, 1957		116.8-121.9	23.8		
0 - 3.8	3.5	121.9-123.6	27.8		
3.8- 5.3	16.5	123.6-124.0	29.2		
5.3- 9.1	45.3	124.0-125.3	15.8		
9.1- 11.1	43.2	125.3-131.2	14.4		
11.1- 13.9	35.5	131.2-132.7	10.9		
13.9- 15.2	26.3	132.7-133.4	32.7		
15.2- 17.1	19.0	133.4-137.2	93.7		
17.1- 18.1	13.2	137.2-138.0	66.7		
18.1- 19.8	9.1	138.0-140.4	66.7		
19.8- 25.8	9.9	140.4-150.4	64.2		
25.8- 27.7	13.7	150.4-154.8	67.8		
27.7- 30.9	18.8	154.8-157.4	61.9		
30.9- 35.4	14.3	157.4-160.8	39.5		
35.4- 36.8	10.3	160.8-165.4	34.7		
36.8- 42.6	10.1	165.4-169.8	40.6		
42.6- 43.8	15.7	169.8-174.2	31.5		
43.8- 45.0	44.9	174.2-178.1	32.4		
45.0- 46.0	123.2	178.1-181.2	49.3		
46.0- 49.6	169.9	181.2-184.4	41.7		
49.6- 50.0	128.2	184.4-187.3	52.5		
50.0- 50.5	83.2	187.3-187.9	37.5		
50.5- 51.4	47.7	187.9-191.2	19.6		
51.4- 52.6	36.5	191.2-191.8	20.9		
52.6- 55.0	40.7	191.8-194.1	12.9		
55.0- 57.1	41.3	194.1-195.6	10.9		
57.1- 58.0	25.3	195.6-199.1	18.5		
58.0- 61.3	21.4	199.1-199.8	32.8		
61.3- 63.6	29.3				
63.6- 65.2	22.0				
65.2- 68.4	25.1				
68.4- 69.8	24.6				
69.8- 72.0	12.3				
72.0- 73.8	14.3				
73.8- 80.1	17.5				
80.1- 84.7	20.6				
84.7- 88.3	33.8				
88.3- 91.4	67.8				
91.4- 92.7	18.6				
92.7- 95.1	28.2				
95.1- 98.5	20.9				
98.5-101.5	10.9				
101.5-103.2	27.7				
103.2-108.6	32.0				
108.6-115.0	27.6				
115.0-116.1	22.4				





Ross Ice Shelf Traverse  
 Station Site 19.0  
 Date 20-21 December 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.8	.5/.1-.3	3:2	Very slight crust at 1.8
1.8- 8.8	.3-.5/.2-.6	4:1	
8.8- 11.4	.6/.3-.5 occ. .1	2:1	
11.4- 17.2	.3-.6/.2-1.0	3:1	Loose grains
17.2- 21.7	.7-.5/1.0	4:1	
21.7- 22.1	1.0/.7-1.1	3:1	Zone of loose grains
22.1- 23.3	.7-1.0/.5	5:1	More closely packed
23.3- 26.7	.7-.5/1.0	4:1	Very slight crust at 23.3
26.7- 27.4	1.0-.7/1.2	2:1	Loose grains; crust from 26.7- 26.8
27.4- 32.1	.3-.5/.7 occ. 1.0	4:1	
32.1- 33.1	.1-.2/.3-.5	5:1	
33.1- 36.2	.4-.2/.6-1.0	6:1	Some needles
36.2- 39.4	1.0-.8/.5-.7	2:1	Crust at 36.2; loose grains and platelets
39.4- 41.2	.3-.5/.1-.3-.6	3:1	Crust from 39.4-39.5
41.2- 43.1	1.0-1.1/.5-.7	2:1	Faint crust at 43.1
43.1- 46.1	1.0-1.2/.8-1.5	6:1	Crust from 46.1-46.2
46.1- 48.5	1.0-1.3/1.5-1.7	5:1	Slightly cemented under crust
48.5- 52.3	1.3-1.5/1.7	2:1	Loose grains
52.3- 55.4	.3-.5/.7	3:1	Well packed
55.4- 56.3	1.0-.7/1.5	2:1	Loose grain zone
56.3- 57.8	.7/.3-.5	3:1	Crust from 57.8-57.9
57.8- 60.6	.7-.8/.5-1.0	4:1	
60.6- 64.4	.6-.8/.4-1.0	3:1	Slight crust at 64.4
64.4- 66.8	.8/.6-1.0	2:1	
66.8- 70.2	1.0/.6-.8	3:1	
70.2- 71.1	1.0-1.2/.8-1.3	3:1	
71.1- 72.7	.8-.5/1.0	4:1	
72.7- 75.9	1.3-1.5/1.7	3:1	Loose grains
75.9- 78.8	1.5-1.7/1.0-1.3	2:1	Loose grains; slight crust at 75.9
78.8- 82.1	1.0-1.3/.7-1.5	4:1	Slight crust at 78.8
82.1- 83.5	1.0-1.1/1.3	2:1	
83.5- 85.2	1.0/1.1-1.3	2:1	
85.2- 86.8	1.3-1.5/1.1-1.7	2:1	
86.8- 87.0	1.3-1.5/1.7	3:1	Crust of cemented grains
87.0- 89.1	1.1-1.0-1.3/1.5	4:1	
89.1-101.3	1.0-.8/1.2-1.4	5:1	
101.3-109.5	.6-.8/.8-1.0	5:1	
109.5-109.6			Crust
109.6-114.1	1.0-.7/1.2	3:1	
114.1-115.7	1.4-1.6/1.8	2:1	Loose; slight crust at 115.7
115.7-119.1	.7-1.0/.5-1.2	3:1	

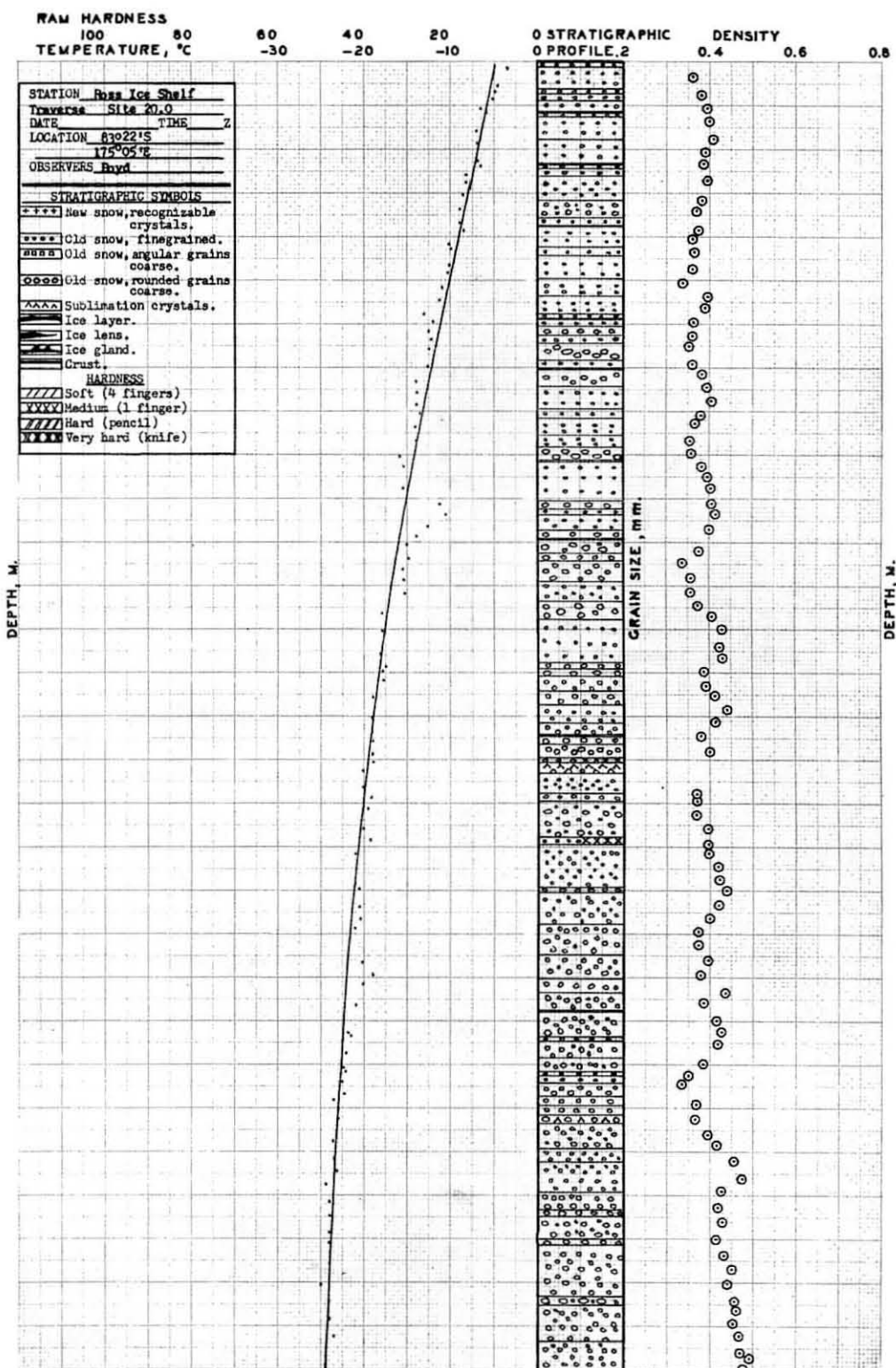
Ross Ice Shelf Traverse  
Station Site 19.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
119.1-126.1	.8-1.0/.6-.8-1.2	4:1	
126.1-131.1	1.0-1.2/.7-1.0	3:1	
131.1-133.4	1.3-1.5/1.0-1.3-1.7	4:1	
133.4-136.5	.3-.5/.7	3:1	Slight crust 136.5-136.6
136.5-140.8	1.0-.8/.6-1.2	2:1	
140.8-153.1	.7-1.0/.5-1.2	3:1	
153.1-155.8	1.2-1.6/1.8-2.0	3:1	Loose; slight crust at bottom
155.8-166.6	.7-.9/1.1-1.3	6:1	Very well packed
166.6-169.7	1.0-1.3/1.3-1.6	2:1	Loose
169.7-170.4	1.2-1.4/1.6-1.8	3:1	
170.4-170.5			Crust
170.5-173.5	1.5-2.3/1.0-1.3	4:1	Loose; some cupped
173.5-178.5	1.3-1.8/.8-1.1-1.8-2.4	3:1	Loose; crust at 178.5
178.5-180.8	1.0-1.4/1.4-1.8	3:1	Cupped
180.8-185.5	1.0-1.2/1.2-1.5; .8-1.0	3:1	
185.5-187.4	1.0-1.4/1.4-1.8 occ. 2.0	5:1	
187.4-192.8	.8-1.1/1.1-1.3	4:1	Slight crust at bottom
192.8-195.3	1.2-1.4/1.5-1.7	3:1	
195.3-197.9	1.5-3.0/occ. 4.0	4:1	Some cupped
197.9-	.8-1.0/1.0-1.2	3:1	

# RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 19.2		136.3-142.6	32.8	95.1-105.6	67.0
December 21, 1957		142.6-150.2	43.7	105.6-110.0	54.2
0 - 2.1	3.7	150.2-160.0	47.1	110.0-115.0	94.2
2.1- 6.0	8.3	160.0-170.2	45.4	115.0-119.2	118.5
6.0- 12.2	16.1	170.2-174.9	36.1	119.2-121.2	104.2
12.2- 15.7	26.1	174.9-177.5	142.7	121.2-124.7	61.4
15.7- 19.5	34.8	177.5-179.5	154.2	124.7-125.2	44.2
19.5- 25.8	25.4	179.5-183.1	59.8	125.2-131.1	26.2
25.8- 30.2	23.7	183.1-187.7	47.7	131.1-134.5	33.6
30.2- 34.9	28.7	187.7-190.0	30.3	134.5-140.0	58.8
34.9- 35.8	47.6	190.0-192.6	31.1	140.0-147.3	53.5
35.8- 36.2	28.2	192.6-195.5	52.5	147.3-148.1	191.7
36.2- 42.3	26.1	195.5-196.0	104.2	148.1-151.1	154.2
42.3- 45.8	23.2	196.0-199.9	127.2	151.1-153.6	68.2
45.8- 48.8	29.9			153.6-160.3	69.8
48.8- 50.1	57.0			160.3-162.5	45.1
50.1- 52.7	41.7	Station 19.4		162.5-167.8	40.0
52.7- 53.6	14.3	December 22, 1957		167.8-172.1	60.0
53.6- 56.9	15.3	0 - 3.1	3.5	172.1-173.0	26.4
56.9- 65.2	17.7	3.1- 5.3	16.9	173.0-176.5	29.9
65.2- 66.1	14.3	5.3- 6.5	86.6	176.5-179.0	137.6
66.1- 70.0	14.8	6.5- 8.0	109.7	179.0-184.7	179.7
70.0- 73.9	13.5	8.0- 9.2	69.8	184.7-190.3	118.4
73.9- 75.2	26.3	9.2- 11.4	57.8	190.3-192.7	87.6
75.2- 77.1	40.0	11.4- 15.1	49.1	192.7-194.5	54.2
77.1- 78.9	53.8	15.1- 17.1	43.2	194.5-199.8	75.9
78.9- 80.1	153.2	17.1- 17.9	28.2		
80.1- 81.5	146.2	17.9- 28.7	21.7		
81.5- 85.5	115.7	28.7- 29.2	23.2		
85.5- 89.7	86.6	29.2- 31.1	19.0		
89.7- 90.4	74.6	31.1- 37.2	21.3		
90.4- 95.0	68.4	37.2- 41.6	25.9		
95.0- 97.4	70.8	41.6- 49.9	24.9		
97.4-101.0	62.6	49.9- 56.1	48.4		
101.0-105.2	51.8	56.1- 57.2	21.4		
105.2-108.2	60.8	57.2- 59.6	28.2		
108.2-110.1	56.8	59.6- 62.0	40.7		
110.1-114.1	54.2	62.0- 64.9	58.4		
114.1-116.1	54.2	64.9- 67.8	65.3		
116.1-120.0	70.8	67.8- 68.4	53.2		
120.0-120.8	154.2	68.4- 74.3	28.6		
120.8-122.5	121.8	74.3- 75.5	28.2		
122.5-123.3	66.7	75.5- 78.5	29.9		
123.3-125.5	26.9	78.5- 80.3	36.5		
125.5-130.2	38.3	80.3- 85.1	32.4		
130.2-135.2	22.2	85.1- 89.6	25.4		
135.2-136.3	26.9	89.6- 92.0	65.8		
		92.0- 95.1	80.6		



Ross Ice Shelf Traverse  
 Station Site 20.0  
 Date \_\_\_\_\_  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.3	.3-.2/.1	3:1	Crust on top
1.3- 6.2	.3-.2/.5-.1	4:1	
6.2- 7.3	.3-.5/.2-.1	3:1	
7.3- 8.8	.2-.1/.3-.5	4:1	
8.8- 11.3	.5-.7/.3-.5	3:1	
	Very occ. .8		
11.3- 12.3	.5-.7/.3-.5	2:1	Crust from 11.3-11.4; numerous wind drift patterns
12.3- 17.5	.2-.3/.5-.7	5:1	
17.5- 23.3	.3-.5/.7	4:1	
23.3- 24.1	.5-.7/.3-.8	2:1	
24.1- 26.0	.5-.7/.3-.5-1.0	4:1	Crust from 24.1-24.2
26.0- 31.7	.3-.5/.1-.2 occ. .7	3:1	
31.7- 35.6	.5-.7/.3-.5 occ. 1.0	4:1	
35.6- 37.1	.3-.2/.5-.7	3:1	
37.1- 42.1	.3-.5/.7	2:1	Crust from 37.1-37.2
42.1- 44.3	.2-.3/.3-.5	4:1	Slight crust at 42.1
44.3- 49.8	.5/.3-.5	2:1	
49.8- 53.4	.5-.7/.3-.5-1.0	4:1	
53.4- 57.7	.2-.3/.5	4:1	
57.7- 58.6	.3-.5-.7/1.0 occ.	4:1	
58.6- 58.7			Crust
58.7- 60.2	.2-.4/.4-.6 occ. .8	3:1	
60.2- 62.4	1.2-1.8/2.0	3:1	Some cupped shaped crystals; loose
62.4- 64.3	1.0/.5-.7	3:1	
64.3- 68.1	1.4-2.1		Loose
68.1- 70.1	.7-1.0/.5-.7	3:1	Some cemented
70.1- 70.2			Crust
70.2- 74.1	1.0-1.2/.8-1.0	3:1	
74.1- 79.5	.3-.5/.7	4:1	
79.5- 81.5	.5-.7/.3-1.0	4:1	
81.5- 85.0	.3-.5/.7-.9	4:1	
85.0- 88.0	.5-.8/1.0	6:1	
88.0- 91.4	1.0-1.2/1.2-1.5	6:1	Crust at 91.4
91.4-100.4	.5-.7/.3-.5-.7-.9	4:1	
100.4-102.1	1.0-1.3/.8 occ. 1.5	4:1	Loose
102.1-103.8	.7-1.0/.6-1.1	3:1	
103.8-107.3	1.0/.6-.8	3:1	Slight crust at 107.3
107.3-109.1	1.0-1.3/.8-1.0-1.5 occ. .7	3:1	
109.1-109.2			Crust
109.2-112.1	1.3-1.5/1.0-1.2	3:1	
112.1-114.1	1.5-1.7/1.3-1.7 occ. 1.0	3:1	Slight crust at bottom



Ross Ice Shelf Traverse  
Station Site 20.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
114.1-119.0	1.5-1.8/1.3-1.5	2:1	
119.0-123.4	.7-.5/1.0-1.2	3:1	
123.4-127.9	.8-1.0/1.3-1.5	6:1	
127.9-137.5	.8-1.0/.6-1.2	3:1	
137.5-139.1	1.0-1.2/.8-1.0-1.3	3:1	
139.1-140.9	1.2-1.4/1.0-1.2-1.6	2:1	
140.9-144.1	1.3-1.7/1.0-1.8	2:1	
144.1-147.3	1.2-1.4/1.0-1.2 occ. 1.5	3:1	
147.3-151.4	.8-1.0/.6-1.2	4:1	
151.4-154.1	1.3-1.5/.8-1.0-1.3	2:1	
154.1-154.2			Crust
154.2-156.3	1.2-1.4/1.0-1.2-1.6	4:1	
156.3-159.6	1.5-2.1		Loose
159.6-160.6	1.0-1.3/1.5	2:1	Slightly cemented
160.6-163.1	1.5-2.3		Some cupped
163.1-167.4	.5-.7/.7-.9	5:1	
167.4-167.6	1.0-1.3/.8-1.0	2:1	
167.6-169.4	1.0/.5-.7-1.2	3:1	
169.4-177.9	1.8-3.2/1.5-1.8	3:1	Crust at bottom; loose grains 4.0
177.9-179.5	.8-1.1		Cemented grains
179.5-189.3	1.1-1.4/.8-1.1-1.4-1.7	3:1	
189.3-190.2	1.0-1.3/.7-1.3-1.5	5:1	
190.2-197.8	1.0-.7/1.1-1.3	4:1	
197.8-204.9	1.3-1.7/1.0-1.3	2:1	
204.9-210.2	1.3-1.6/1.8 occ. 2.0	3:1	
210.2-213.6	1.0-1.4/1.5-1.7	3:1	
213.6-217.8	1.5-2.1/1.0-1.3-1.5	2:1	
217.8-223.6	1.2-1.4/1.4-1.7 occ. .8	3:1	Crust at top
223.6-224.6	.8-1.0/1.0-1.2	3:1	
224.6-228.6	1.0-1.2/.8-1.4	3:1	
228.6-231.7	.7-1.0/1.1-1.3	5:1	
231.7-232.6	1.2-1.4/1.0-1.2	3:1	
232.6-234.1	.7-1.0/.5-1.2	3:1	Crust at 234.1
234.1-237.1	1.2-1.5/1.7; 1.0-1.2	3:1	
237.1-239.6	1.1-1.3/1.0-1.5	2:1	
239.6-241.4	1.1-1.3/1.0-1.3-1.5-1.7	4:1	
241.4-243.7	1.8-3.2		Loose
243.7-249.2	1.3-1.7/1.0-1.3	3:2	
249.2-252.3	.8-1.0/1.0-1.2	3:1	
252.3-259.2	1.0-1.3/.7-1.0	3:2	
259.2-263.3	1.2-1.4/.7-1.0	3:1	
263.3-264.9	1.3-1.5/1.0-1.3	2:1	
264.9-270.1	1.0-1.2/.7-1.0	3:1	
270.1-271.1	1.2-1.4/1.0-1.2 occ. 1.5	3:1	
271.1-283.1	1.1-1.3/1.0-1.4	2:1	



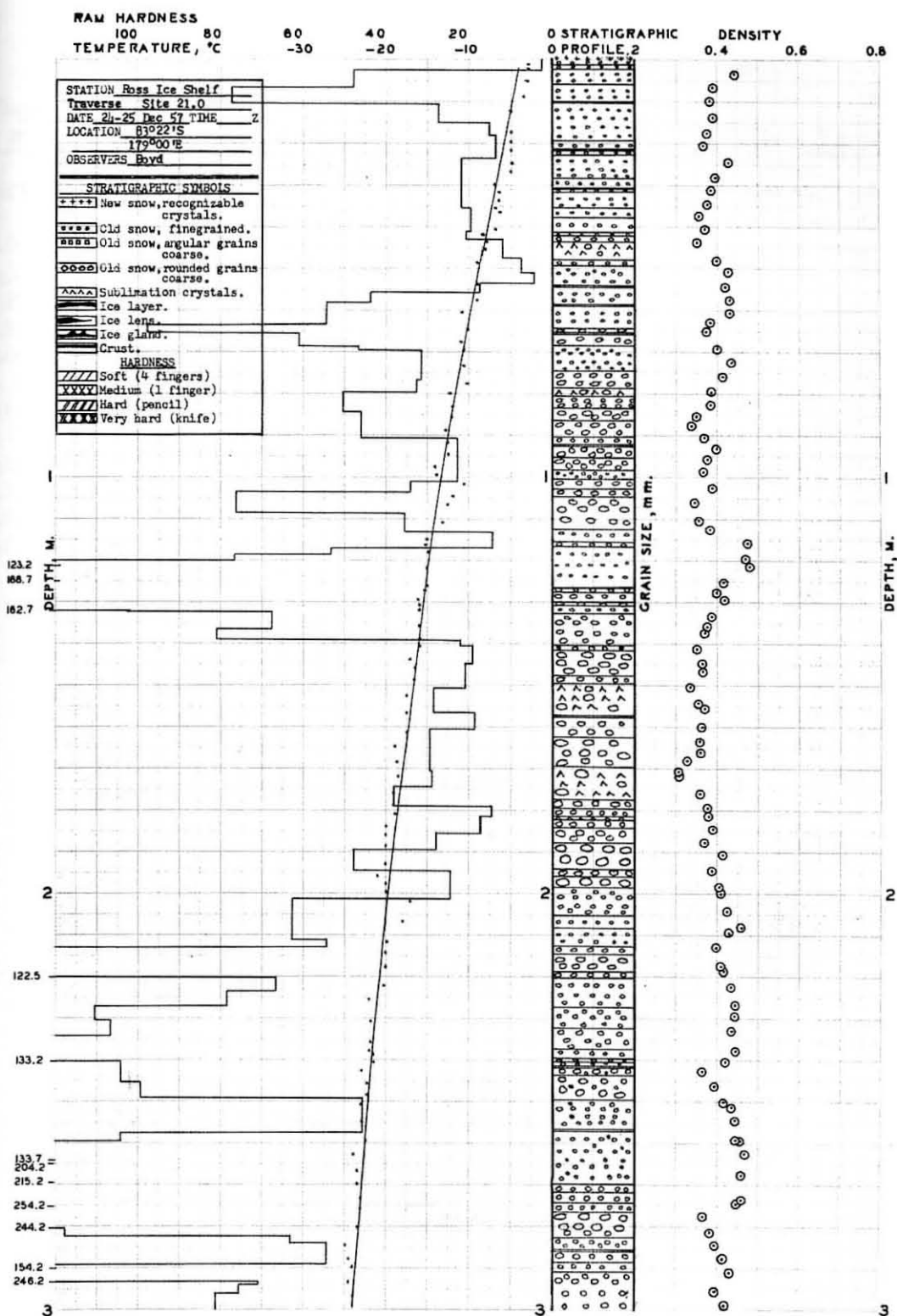
Station Ross Ice Shelf Traverse  
Site 20.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
283.1-285.1	1.2-1.4/1.6, 1.0	3:1	
285.1-293.1	.8-1.1/1.1-1.3	2:1	
293.1	.7-1.0/1.2	3:1	Very well packed

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 20.2		180.5-181.8	158.1	148.1-155.3	50.0
December 24, 1957		181.8-183.8	84.2	155.3-160.5	50.4
0 - 3.2	3.5	183.8-186.3	52.2	160.5-175.0	71.8
3.2- 5.0	25.4	186.3-189.0	26.4	175.0-185.6	86.3
5.0- 7.1	93.7	189.0-191.1	23.3	185.6-191.7	73.1
7.1- 11.1	78.2	191.1-193.7	50.4	191.7-199.5	52.9
11.1- 11.5	78.2	193.7-199.3	48.9	199.5-200.0	44.2
11.5- 15.0	63.2	Station 20.5			
15.0- 16.2	53.2	December 24, 1957			
16.2- 19.0	19.9	0 - 7.9	3.3		
19.0- 22.1	34.9	7.9- 10.2	14.1		
22.1- 26.2	34.9	10.2- 13.6	17.9		
26.2- 30.1	18.6	13.6- 15.8	12.3		
30.1- 36.2	14.7	15.8- 20.1	9.0		
36.2- 40.4	15.1	20.1- 22.2	10.3		
40.4- 45.6	14.8	22.2- 24.0	28.2		
45.6- 52.1	14.0	24.0- 30.1	21.2		
52.1- 59.8	29.2	30.1- 34.1	18.2		
59.8- 61.0	78.2	34.1- 35.2	12.3		
61.0- 66.9	89.4	35.2- 36.8	15.7		
66.9- 70.9	53.2	36.8- 38.7	26.9		
70.9- 72.1	36.5	38.7- 45.3	30.5		
72.1- 75.3	15.7	45.3- 50.8	43.2		
75.3- 80.2	11.4	50.8- 51.8	103.2		
80.2- 83.1	17.1	51.8- 60.4	156.7		
83.1- 86.2	48.4	60.4- 64.9	56.6		
86.2- 89.8	36.5	64.9- 70.1	49.4		
89.8- 95.6	27.3	70.1- 80.5	58.0		
95.6- 98.4	65.7	80.5- 87.0	74.0		
98.4-101.1	56.0	87.0- 87.9	25.4		
101.1-105.3	56.6	87.9- 90.1	35.0		
105.3-122.4	30.5	90.1- 94.8	41.5		
122.4-129.7	43.9	94.8- 98.7	47.8		
129.7-132.3	96.9	98.7- 99.0	37.5		
132.3-136.1	75.3	99.0-106.5	26.9		
136.1-142.3	36.4	106.5-110.1	48.7		
142.3-144.2	98.9	110.1-117.3	47.3		
144.2-149.2	100.2	117.3-121.3	79.2		
149.2-154.9	46.3	121.3-127.1	81.8		
154.9-158.1	35.5	127.1-129.2	42.4		
158.1-159.5	18.5	129.2-134.0	35.5		
159.5-165.3	45.6	134.0-138.1	57.8		
165.3-169.9	39.0	138.1-138.5	54.2		
169.9-176.4	38.1	138.5-144.1	23.9		
176.4-177.9	84.2	144.1-146.3	40.6		
177.9-178.7	191.7	146.3-148.1	70.9		
178.7-180.5	393.2				



Ross Ice Shelf Traverse  
 Station Site 21.0  
 Date 24-25 December  
 Observer Boyd

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
Surface	.5-.7		~ 5.0 of new fallen snow; ~ 5 cm above stratigraphy
0.0-1.3	.2-.3/.1	2:1	Crust over this zone
1.3-2.2	.1-.2/.3	3:1	Crust from 1.3-1.4
2.2-5.9	.2-.3/.1-.5	4:1	Crust from 2.2-2.3
5.9-10.0	.5-.7/.3-.5	4:1	Slight crust at 10.0
10.0-19.3	.3-.6/.1-.3	3:1	
19.3-21.6	.5-.7/.2-.5-.8	6:1	
21.6-21.7			Crust
21.7-22.8	.5-.7/.3-.5-1.0	5:1	
22.8-28.1	.3-.5/.1-.3-.7	2:1	Slight crust at 28.1
28.1-30.6	.2-.4/.1-.5-.7	4:1	
30.6-31.6	.3-.5/.1-.2	2:1	
31.6-31.7			Crust
31.7-35.2	.5-.7/.3-.5	4:1	
35.2-35.5	1.0-1.2/.7-1.0	3:1	
35.5-37.4	.2-.3/.5-.7 occ. .8	3:1	
37.4-37.5			Crust
37.5-41.2	1.0-1.3/.7-1.0	3:1	
41.2-42.0	1.2-1.4/1.6	3:1	Some cupped shaped
42.0-43.6	.8-1.0/1.2, .6	3:1	Slightly cemented
43.6-47.8	2.3-1.8/2.5-3.1	2:1	Loose; some cup shaped
47.8-49.1	1.0-1.2/.8-1.0	3:1	
49.1-49.2			Crust
49.2-54.0	.8-1.0/.6-.8	3:1	
54.0-54.2	1.0-1.2/1.4	5:1	
54.2-58.7	.6-.8/.8-1.0 occ. 1.2	3:1	
58.7-58.8			Crust
58.8-64.2	.7-.5/1.0, .8	3:1	
64.2-65.2	1.2-1.4/1.0-1.2-1.6 occ. 1.8	3:1	
65.2-65.3			Crust
65.3-68.6	1.3-1.7/1.0-1.3 occ. 2.0	3:1	Slight crust at 68.6; some cup shaped
68.6-74.6	.8-1.0/1.0-1.2	3:1	
74.6-78.7	1.2-1.4/1.0-1.2-1.6-1.8	3:1	
78.7-80.5	1.3-1.6/1.3-1.0-1.8-2.0	5:1	Some cup shaped
80.5-83.2	1.0-1.3/.7-1.0-1.5	4:1	Slight crust at 80.5
83.2-86.2	1.3-1.5-1.8/1.0-1.3-1.8-2.0	4:1	
86.2-90.2	1.2-1.4/1.4-1.8 occ. 2.0	3:1	Slight crust at 90.2
90.2-92.1	1.0-1.2/1.2-1.4 occ. 1.6	3:1	
92.1-92.2			Crust
92.2-95.2	1.3-1.6/1.0-1.3-1.6-1.8 occ. 2.0	3:1	

Ross Ice Shelf Traverse  
 Station Site 21.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
95.2-98.1	1.0-1.3/.8-1.3-1.7 occ. 2.1	2:1	
98.1-100.3	.5-.7/occ. .8, .3	2:1	Well cemented and very irregular in depth and shape
100.3-102.9	1.2-1.4/1.0-1.2-1.6 occ. 1.8	3:1	
102.9-104.5	1.1-1.3/1.0-1.5	2:1	
104.5-112.4	1.3-1.7/1.0-1.3 occ. 2.0	4:1	Loose grains
112.4-115.6	.5-.7/.8-1.0 occ. 1.2	3:1	
115.6-116.4	1.0-1.2/.8-1.0	3:1	
116.4-126.4	.5-.7/.8 occ. 1.0	3:1	
126.4-126.5			Crust
126.5-127.3	.8-1.0/.6-1.1	2:1	
127.3-127.4			Crust
127.4-130.0	1.2-1.4/1.6-1.8 occ. 1.0-2.0	3:1	
130.0-130.7	1.0-1.3/1.5 occ. .8	2:1	
130.7-132.7	.8-1.1/1.1-1.3	2:1	Slight crust at 132.7
132.7-140.1	1.2-1.4/1.0-1.6 occ. 1.8	3:1	
140.1-140.2			Crust
140.2-141.3	.8-1.1/1.1-1.3 occ. 1.5	3:1	
141.3-147.3	1.5-2.3/1.0-1.3-2.5-3.6	4:1	Loose
147.3-149.5	1.1-1.4/1.0-1.6 occ. 1.8	3:1	Slight crust at 149.5
149.5-157.6	1.5-3.0/1.3-1.5 occ. 4.0	2:1	Loose; some cup shaped grains and air spaces
157.6-157.7			Crust
157.7-162.2	1.2-1.4/1.0-1.2-1.6-1.8	3:1	
162.2-169.5	2.5-3.4/1.5-2.5 occ. 4.0	3:1	
169.5-177.1	2.5-4.0/1.3-1.8	4:1	Loose; some cupped grains
177.1-179.4	1.3-1.7/1.0-1.3-2.0	4:1	
179.4-181.1	1.0-1.2/.8-1.0	3:1	Cemented
181.1-181.9	3.0-4.2/1.5-2.4	3:1	Air spaces; cupped crystals
181.9-184.0	1.2 and 1.4-1.5/1.0-1.2-1.7	3:1	
184.0-187.8	1.3-1.7/.8-1.0-1.2 occ. 2.0	5:1	
187.8-194.0	1.8-2.5/2.5-3.4 occ. 4.0	5:1	
194.0-195.8	1.2-1.4/1.0-1.2-1.6	3:1	
195.8-198.4	1.5-2.2/2.2-3.1	4:1	
198.4-205.1	1.0-1.3/.8-1.3-1.6	2:1	
205.1-208.2	.8-1.0/1.1-1.3	3:1	
208.2-212.8	.7-.5/.8-1.0	3:1	
212.8-214.6	1.0-1.3/.8-1.0 occ. 1.5	6:1	
214.6-218.8	1.2-1.6/1.0-1.2 occ. 1.8	3:1	
218.8-220.1	1.1-1.3/1.0, 1.5, 1.7	3:1	Slight crust at 220.1
220.1-227.0	.7-1.0/1.1-1.3	5:1	Slight crust at 227.0
227.0-232.2	1.0-1.2/1.4, .8 occ. 1.5	4:1	
232.2-237.2	1.1-1.4/1.6, 1.0, .7	3:1	
237.2-237.8	1.2-1.4/1.0-1.2	3:2	

Ross Ice Shelf Traverse  
 Station Site 21.0  
 (Continued)

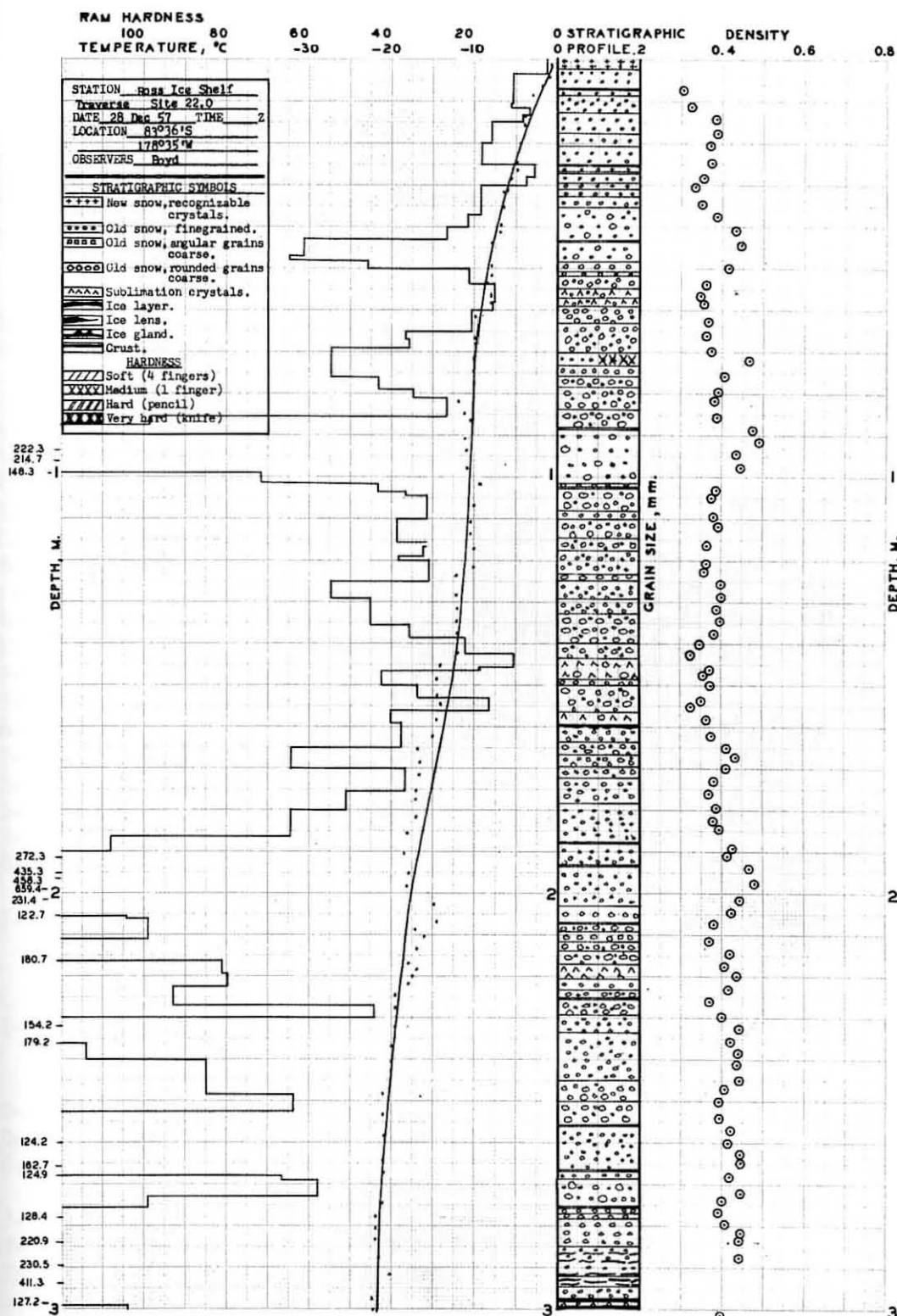
Depth cm	Grain Size	Ratio	Remarks
237.8-239.8	.8-1.0/1.1-1.2	3:1	
239.8-240.1	1.2-1.4/1.5-1.7	6:1	
240.1-241.5	.7-1.0/1.1	3:2	Slight crust at 241.5
241.5-243.7	1.3-1.6/1.0-1.3-1.6-2.0	5:1	
243.7-249.7	1.5-1.7/1.3-1.5 occ. 2.0	4:1	Well packed
249.7-256.4	.7-1.0-1.2/.5-1.3	5:1	
256.4-256.5			Crust
256.5-269.8	.7-1.0/.5-.7-1.1	3:1	Well packed
269.8-271.9	1.1-1.3/.7-1.0-1.5	3:1	
271.9-274.2	1.2-1.4/1.0-1.2-1.6-1.8	6:1	
274.2-276.3	1.1-1.3/1.3-1.7	7:1	
276.3-282.6	1.5-2.3/1.0-1.3-2.3-2.6	4:1	
282.6-285.8	.7-1.0/.5-.7	3:1	Well packed
285.8-285.9			Crust
285.9-288.5	1.3-1.5/1.5-1.7-1.1-1.3	5:1	
288.5-290.7	.8-1.1/1.1-1.4	3:1	
290.7-300.0*	1.2-1.5/.8-1.0-1.2	3:2	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 21.2		159.3-165.9	51.7		
December 26, 1957		165.9-168.0	31.8		
0 - 5.5	2.4	168.0-169.0	33.2		
5.5- 10.1	7.6	169.0-180.2	25.5		
10.1- 12.0	25.9	180.2-190.3	54.7		
12.0- 15.7	18.4	190.3-192.3	68.2		
15.7- 17.0	9.9	192.3-199.6	99.0		
17.0- 23.8	10.3	199.6-200.7	86.0		
23.8- 29.4	4.0	200.7-208.6	80.2		
29.4- 30.8	5.8	208.6-215.6	118.5		
30.8- 32.7	10.1	215.6-220.3	74.4		
32.7- 34.5	18.9	220.3-223.3	124.2		
34.5- 36.2	37.5	223.3-230.2	163.7		
36.2- 37.4	18.9	230.2-233.5	95.1		
37.4- 40.0	13.7	233.5-236.8	52.7		
40.0- 42.0	47.2	236.8-239.9	55.8		
42.0- 43.7	37.5	239.9-247.0	84.5		
43.7- 44.9	18.9	247.0-251.1	150.7		
44.9- 47.2	10.9	251.1-257.8	111.7		
47.2- 50.1	22.9	257.8-260.5	245.2		
50.1- 55.1	79.2	260.5-263.1	273.2		
55.1- 59.6	69.9				
59.6- 69.6	60.2				
69.6- 69.8	153.2				
69.8- 73.3	37.5				
73.3- 79.7	18.8				
79.7- 81.0	18.6				
81.0- 82.1	12.3				
82.1- 85.7	14.3				
85.7- 87.0	7.0				
87.0- 89.7	8.8				
89.7- 92.8	19.3				
92.8- 95.0	21.4				
95.0-101.1	14.7				
101.1-109.0	22.2				
109.0-109.8	15.7				
109.8-113.2	15.0				
113.2-117.0	15.0				
117.0-120.8	19.0				
120.8-125.1	19.5				
125.1-127.2	70.0				
127.2-131.5	133.2				
131.5-136.4	93.0				
136.4-143.9	83.2				
143.9-149.9	36.5				
149.9-154.7	37.0				
154.7-159.3	42.3				





Ross Ice Shelf Traverse  
 Station Site 22.0  
 Date 28 December 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 2.1	2.0-3.0		New fallen snow; crystal plates in- tact
2.1- 7.0	.1/.2-.3	4:1	
7.0- 7.1			Crust, cemented grains
7.1- 8.4	.2/.1-.3	3:1	Wind slab (?)
8.4- 12.6	.3-.5/.2-.7	3:1	
12.6- 17.6	.2-.3/.5-.7	4:1	
17.6- 20.5	.3-.5/.5-.7; .2	3:1	
20.5- 25.0	.5-.7/.3-.5 occ. .1	4:1	Slight crust at 25.0
25.0- 26.8	.3-.5/.7-.8	3:1	
26.8- 26.9			Crust
26.9- 29.4	.8-1.0/.5-.8-1.2	4:1	Slight crust at 29.4
29.4- 31.9	.5-.7/1.0-1.2-1.3	5:1	Slight crust at 31.9
31.9- 32.9	1.0-1.2/.7-1.0	3:2	Slight crust at 32.9
32.9- 35.3	1.0-1.2/.8-1.0	3:2	
35.3- 43.6	.7-1.1/1.1-1.3; .5	6:1	
43.6- 43.7			Crust; wavy
43.7- 48.1	.5-.7/1.0-1.2	3:1	
48.1- 48.3	1.0-1.3/1.5	5:1	
48.3- 50.7	1.0-1.2/.7-1.0 occ. 1.5	3:1	
50.7- 51.8	1.1-1.3/.8-1.1	2:1	
51.8- 54.7	1.2-1.4/1.4-1.6, 1.0 occ. 1.8	4:1	Very slight crust at 54.7
54.7- 57.1	1.5-1.8/1.3-1.5	3:1	Some cupped; loose with air spaces; crust from 57.1- 57.2
57.1- 59.0	1.7-2.4/2.4-2.8 occ. 3.0		Air spaces, some cup shaped crystals; few 1.0
59.0- 63.0	1.2-1.4/1.0-1.2; 1.6-1.8	4:1	Occasionally grains 2.0
63.0- 70.0	1.0-1.3/.7-1.0; 1.3-1.6	5:1	
70.0- 73.3	.7-1.0/.5-.7	3:2	Possible wind slab, hard packed
73.3- 75.7	1.1-1.3/1.3-1.5	4:1	
75.7- 78.2	1.0-1.3/1.3-1.5; .8 occ. 1.7	4:1	
78.2- 83.4	1.1-1.3/.8-1.0; 1.3-1.6	5:1	
83.4- 88.0	1.3-1.6/1.0-1.3; 1.6-1.8 occ. 2.0	4:1	
88.0- 88.1			Crust; possible wind slab or melt
88.1-101.4	.7-1.1/.5-.7 occ. 1.3		Very hard packed

Ross Ice Shelf Traverse  
 Station Site 22.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
101.4-102.2	1.1-1.3/1.3-1.6	2:1	Crust
102.2-102.3			
102.3-108.0	1.2-1.4/1.4-1.7; 1.0-1.2	3:1	
108.0-110.1	1.3-1.7/1.0-1.3	4:1	
110.1-114.8	1.2-1.5/1.0-1.2 occ. 1.7	3:1	
114.8-117.6	1.1-1.3/1.3-1.5; .8	4:1	
117.6-123.1	1.0-1.2/.8-1.0-1.4	6:1	
123.1-124.8	1.3-1.6/1.0-1.3	5:1	
124.8-129.2	.8-1.1/1.1-1.3	4:1	
129.2-132.9	.8-1.0/1.0-1.3	3:1	
132.9-139.9	1.2-1.4/1.0-1.2; 1.4-1.6	3:1	
139.9-143.5	1.3-1.6/1.0-1.3; 1.6-1.8	2:1	
143.5-148.4	1.5-2.3/2.3-3.1 occ. 1.0	4:1	Loose; some cup shaped crystals
148.4-150.0	1.0-1.2/.8-1.0	2:1	
150.0-156.3	1.3-1.6/1.0-1.3; 1.6-1.8	2:1	
156.3-159.5	1.5-1.8/2.0-2.3 occ. 3.0	4:1	Some cup shaped crystals
159.5-159.6			Ice layer
159.6-163.4	1.1-1.3/1.0-1.3 occ. 1.5	3:1	
163.4-166.7	1.3-1.5/1.0-1.3 occ. 1.7	2:1	
166.7-169.7	1.0-1.3/.8-1.0	2:1	
169.7-172.3	1.2-1.4/1.0-1.2; 1.4-1.6	3:2	
172.3-178.3	1.1-1.3/.8-1.0-1.5	4:1	
178.3-187.8	1.0-1.2/.8-1.0 occ. 1.3	2:1	
187.8-187.9			Crust
187.9-193.2	.7-1.0/.5-.7 occ. 1.2	3:1	
193.2-193.3			Crust; irregular in depth; possible wind slab
193.3-203.1	.5-.7/.7-1.0	3:1	
203.1-207.3	1.2-1.4/1.4-1.6; 1.0-1.2	3:1	
207.3-207.4			Crust
207.4-209.2	1.1-1.3/1.3-1.5	3:1	
209.2-211.8	1.2-1.4/1.0-1.2; 1.4-1.6	4:1	
211.8-213.8	1.3-1.5/1.5-1.8 occ. 2.0	3:1	
213.8-217.1	.7-1.0/1.0-1.2; .5-.7		
217.1-220.5	1.5-2.1/2.6-2.1 occ. 3.0	4:1	Loose; some cup shaped crystals
220.5-223.3	1.1-1.3/1.0-1.3-1.5	4:1	
223.3-225.3	1.0-1.3/.8, 1.5	3:1	
225.3-225.4			Crust
225.4-229.2	1.3-1.5/1.1-1.3; 1.5-1.7	3:1	
229.2-233.4	.8-1.0/1.0-1.2	3:1	
233.4-245.0	1.0-1.2/.8-1.0 occ. 1.4	5:1	
245.0-250.0	1.0-1.3/.8-1.0 occ. 1.5	3:1	
250.0-255.7	1.2-1.4/1.0-1.2; 1.4-1.6	3:1	
255.7-255.8			Crust

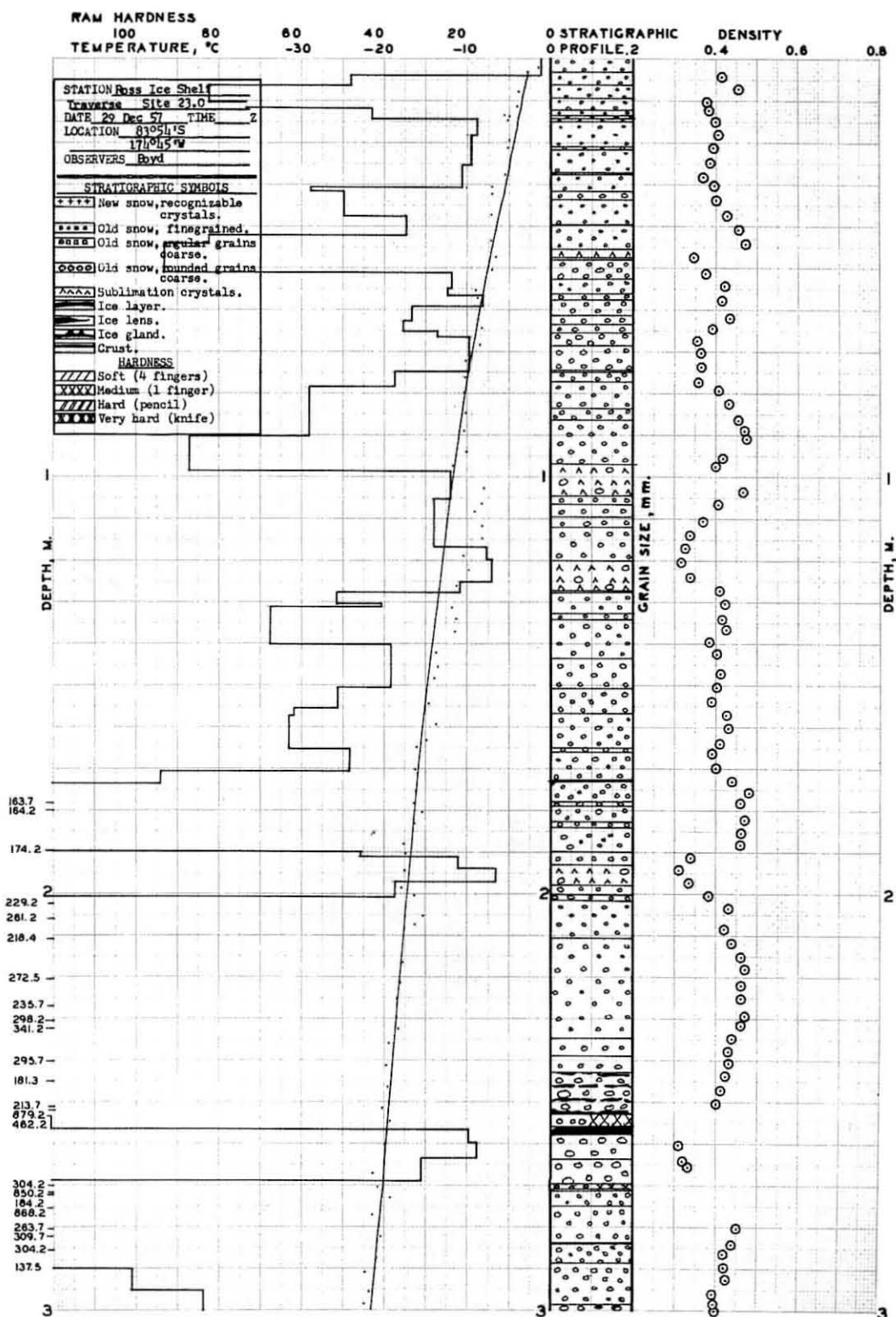
Ross Ice Shelf Traverse  
 Station Site 22.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
255.8-266.5	.7-1.0/1.1; .5	3:1	Hard packed
266.5-266.6			Crust
266.6-268.5	.7-.9/.5-.7-1.0	3:1	
268.5-268.8	1.2-1.5/1.0-1.2-1.7	3:1	
268.8-275.3	.8-1.1/1.1-1.3	2:1	
275.3-275.4			Crust
275.4-277.0	1.0-1.2/1.2-1.4; .8	3:1	
277.0-278.3	1.3-1.6/1.0-1.3-1.8	4:1	
278.3-284.8	1.2-1.5/1.0-1.2	3:1	All layers show
284.8-292.1	1.2-1.4/1.4-1.6; 1.0-1.2	3:1	Very thin ice layer at 292.1, well cemented
292.1-294.5	1.0-1.4		Grains usually smaller; well cemented
294.5-297.5			Three heavy ice layers with cemented grains between bands .8 wide; some cement- ing
297.5-305.5	1.3-1.6/1.0-1.3 occ. 1.8	3:1	Loose; not cemented
305.5-311.2			Two very heavy ice layers, with a .8 wide band of cemented grains between, below this layers of cemented grains

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 22.2		150.5-152.5	39.2	132.4-136.2	16.1
December 29, 1957		152.5-164.0	58.1	136.2-137.8	48.0
0 - 6.8	3.3	164.0-166.3	47.7	137.8-145.6	86.2
6.8- 10.1	6.2	166.3-173.2	73.8	145.6-154.3	64.0
10.1- 11.7	15.7	173.2-177.5	39.1	154.3-160.2	85.6
11.7- 14.5	10.3	177.5-184.2	46.0	160.2-168.6	51.8
14.5- 16.2	15.0	184.2-190.1	75.4	168.6-173.2	62.8
16.2- 19.2	29.8	190.1-193.1	104.2	173.2-180.1	114.2
19.2- 21.4	30.5	193.1-199.6	102.6	180.1-188.6	104.2
21.4- 34.5	23.1	199.6-200.0	79.2	188.6-190.6	104.2
34.5- 38.9	23.7			190.6-192.3	27.7
38.9- 41.9	56.5	Station 22.4		192.3-194.7	12.5
41.9- 45.2	66.8	December 29, 1957		194.7-196.1	39.9
45.2- 49.3	32.5	0 - 5.7	3.4	196.1-197.3	45.9
49.3- 52.2	37.7	5.7- 10.3	16.3	197.3-199.5	11.0
52.2- 55.5	16.9	10.3- 15.7	25.4	199.5-205.6	22.3
55.5- 60.7	13.8	15.7- 19.6	59.6	205.6-206.8	62.6
60.7- 64.5	24.3	19.6- 24.1	43.2	206.8-209.8	337.5
64.5- 67.7	12.6	24.1- 25.0	36.5	209.8-213.8	554.2
67.7- 69.2	9.9	25.0- 29.6	33.6	213.8-215.7	241.2
69.2- 75.5	23.8	29.6- 31.3	103.2	215.7-225.4	148.7
75.5- 80.0	13.2	31.3- 34.5	115.7	225.4-231.3	119.4
80.0- 80.4	15.7	34.5- 37.8	39.6	231.3-232.4	304.2
80.4- 90.1	23.8	37.8- 41.3	26.0	232.4-240.2	177.3
90.1- 94.4	28.8	41.3- 42.4	21.4	240.2-243.5	307.2
94.4- 97.5	22.6	42.4- 49.8	22.1	243.5-249.8	314.2
97.5-103.8	26.4	49.8- 51.3	29.9	249.8-251.9	290.2
103.8-105.7	14.7	51.3- 56.1	28.2		
105.7-107.8	9.0	56.1- 59.3	15.7		
107.8-110.1	8.6	59.3- 64.8	26.8		
110.1-113.0	14.6	64.8- 68.7	18.6		
113.0-114.8	20.9	68.7- 71.3	30.1		
114.8-116.9	42.3	71.3- 79.4	27.9		
116.9-119.0	132.7	79.4- 83.6	47.0		
119.0-125.8	158.7	83.6- 88.7	22.3		
125.8-128.3	52.2	88.7- 92.7	23.2		
128.3-129.2	37.5	92.7-100.7	30.5		
129.2-130.9	21.8	100.7-104.9	37.5		
130.9-134.3	16.0	104.9-106.2	181.2		
134.3-135.9	19.8	106.2-110.3	111.5		
135.9-139.5	20.9	110.3-113.9	54.2		
139.5-140.9	14.9	113.9-115.0	31.5		
140.9-142.8	6.8	115.0-118.4	16.0		
142.8-144.5	7.1	118.4-120.1	63.0		
144.5-145.8	11.9	120.1-127.2	81.7		
145.8-148.7	7.7	127.2-131.8	45.5		
148.7-150.5	15.3	131.8-132.4	20.9		



Ross Ice Shelf Traverse  
 Station Site 23.0  
 Date 29 December 1959  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 3.3	.3-.5/.1-.2	3:1	Crust at 2.3-3.4
3.3- 7.1	.1-.2/.3	3:1	Very slight crust at 7.1; hard packed
7.1- 9.7	.2-.3/.1	4:1	Very slight crust at 9.7
9.7- 12.1	.5/.2-.3	2:1	
12.1- 13.3	.5-.7/.3-.5	2:1	
13.3- 14.1	.5-.7/.3-.5 occ. 1.0	4:1	
14.1- 15.0	.3/.2-.5	3:1	
15.0- 21.0	.2-.3/.5	2:1	
21.0- 21.5	.5-.7/.3-.5	2:1	
21.5- 27.4	.5/.3-.7	2:1	
27.4- 27.5			Crust
27.5- 31.8	.7/.3-.5	2:1	
31.8- 33.4	1.0-1.3/.7-1.0 occ. 1.5	2:1	
33.4- 39.7	.3-.5/.5-.7	4:1	
39.7- 45.3	.2-.3/.5-.7	2:1	
45.3- 47.8	1.1-1.3/1.0-1.5	4:1	Some cup shaped crystals
47.8- 47.9			Crust
47.9- 52.9	1.3-1.5/1.5-1.7 occ. 2.0	3:1	
52.9- 56.1	.5-.7/.7-1.0	5:1	
56.1- 57.4	1.0-1.2/.7-1.0; 1.2-1.4	3:1	
57.4- 61.3	1.0-1.2/.7-1.5	3:1	
61.3- 63.3	.8-1.0/1.1-1.3	4:1	
63.3- 65.6	1.3-1.5/1.5-1.7 occ. 2.0	3:2	
65.6- 68.5	1.5-1.7/1.3-1.5 occ. 2.0	3:1	
	Very occ. 2.5		
68.5- 74.5	1.1-1.3/1.3-1.6 occ. 2.0	3:1	
74.5- 74.6			Crust
74.6- 77.1	1.0-1.2/1.3-1.5 occ. 1.7	2:1	Slight crust at 77.1
77.1- 83.7	1.1-1.4/1.4-1.7	3:1	
83.7- 86.2	.8-1.0/1.1-1.3	4:1	
86.2- 96.8	1.0-1.3/1.3-1.5	4:1	Hard packed
96.8-104.3	1.5-2.8/2.8-3.3 occ. 4.0	3:1	Loose; some cup shaped crystals
104.3-106.6	1.0-1.2/.8-1.0-1.3	4:1	
106.6-109.4	1.2-1.4/1.0-1.2 occ. 1.6	2:1	
109.4-112.0	1.3-1.6/1.0-1.3	4:1	
112.0-120.0	1.3-1.7/1.0-1.3 occ. 2.0	3:1	
120.0-127.3	1.5-2.0/1.3-1.5	3:1	Some cup shaped; very loose
127.3-127.4			Crust
127.4-132.7	1.0-1.2/.8-1.2-1.4	3:1	
132.7-134.0	1.1-1.3/.8-1.1	2:1	



Ross Ice Shelf Traverse  
Station Site 23.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
134.0-143.2	1.2-1.4/.8-1.0; 1.4-1.6 occ. 1.8	4:1	Slight crust at 143.2
143.2-150.4	1.0-1.2/.8-1.0	3:1	
150.4-156.7	1.1-1.3/.8-1.1	2:1	
156.7-164.8	.8-1.0/1.0-1.3	3:1	
164.8-165.8	1.1-1.3/1.0-1.4; .8	2:1	
165.8-172.2	1.2-1.5/1.0-1.2	3:1	
172.2-172.3			Crust
172.3-175.5	.7-1.0/.5-.7	3:1	Possible wind slab; hard packed
175.5-178.5	1.1-1.3/1.5 occ. 1.7	5:1	
178.5-182.1	.7-1.0/.5-.7	3:1	
182.1-183.7	1.1-1.3/1.5-1.0	2:1	
183.7-189.8	.5-.8/.8-1.0	3:1	
189.8-192.8	1.2-1.4/1.0-1.2; 1.4-1.6 occ. 1.8	4:1	
192.8-197.4	1.5-2.6/2.6-3.4	3:1	Loose; some cup shaped
197.4-200.0	1.1-1.3/1.3-1.5	3:1	
200.0-201.3	1.3-1.5/1.0-1.3	4:1	
201.3-210.2	1.0-1.2/.8-1.5	5:1	
210.2-234.2	.7-1.0/.5-.7	3:2	Crust from 210.2- 210.3; winter snow very hard packed
234.2-238.5	1.0-1.2/.8-1.0-1.4	3:1	
238.5-242.5	1.1-1.3/1.3-1.5 occ. 1.7	4:1	Cemented slightly
242.5-252.6	1.5-2.0/1.3-1.5	3:1	Very well cemented; ice lens and gland throughout
252.6-255.4	1.0-1.2		Overlain by slight ice layer; well cemented
255.4-257.1			Ice layer; increases to 2 cm in some layers
257.1-263.6	1.5-2.3/2.3-3.2	4:1	Loose
263.6-269.2	1.3-1.5/1.5-1.8 occ. 2.0	4:1	Loose; cemented from 269.2-283.9; on other side of pit it be- comes an ice layer to 10 cm
269.2-270.5	.8-1.1/1.1-1.3	5:1	
270.5-270.6			Crust
270.6-274.4	.7-1.0/.5-.7	2:1	Well packed
274.4-283.8	1.0-1.2/.7-1.0	3:1	
283.8-283.9			Crust
283.9-288.3	.8-1.0/.6-.8	3:1	
288.3-298.2	1.1-1.3/.8-1.1 occ. 1.5	3:1	
298.2-300+	1.2-1.4/1.0-1.2-1.5 occ. 1.7	3:1	

## RAM HARDNESS DATA SHEET

 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 23.2		170.3-177.7	69.1	137.7-142.1	149.7
December 31, 1957		177.7-180.2	132.2	142.1-150.1	260.2
0 - 6.1	3.4	180.2-185.4	142.7	150.1-154.0	273.3
6.1- 7.3	19.9	185.4-191.9	111.7	154.0-157.1	342.6
7.3- 10.0	62.4	191.9-195.2	101.2	157.1-158.1	204.2
10.0- 12.0	83.2	195.2-198.5	167.7	158.1-160.9	111.4
12.0- 15.1	167.7	198.5-199.8	27.3	160.9-164.7	70.0
15.1- 18.2	170.8			164.7-169.0	115.8
18.2- 18.7	83.2	Station 23.4		169.0-180.0	138.7
18.7- 21.2	51.2	December 31, 1957		180.0-183.1	278.3
21.2- 24.8	31.0	0 - 3.2	3.5	183.1-185.5	212.4
24.8- 29.5	24.5	3.2- 5.1	19.0	185.5-189.1	143.1
29.5- 32.1	16.7	5.1- 8.2	71.0	189.1-190.4	504.2
32.1- 33.6	69.9	8.2- 9.1	36.5	190.4-192.3	609.7
33.6- 36.0	190.7	9.1- 15.4	34.9	192.3-195.1	379.2
36.0- 39.3	233.2	15.4- 17.8	53.2		
39.3- 40.9	253.2	17.8- 18.5	46.0		
40.9- 41.5	86.6	18.5- 26.0	16.5		
41.5- 43.0	69.9	26.0- 30.5	21.0		
43.0- 45.7	47.7	30.5- 40.3	23.6		
45.7- 50.2	38.8	40.3- 43.0	47.6		
50.2- 55.3	50.3	43.0- 49.4	65.8		
55.3- 59.6	31.1	49.4- 54.7	76.8		
59.6- 61.4	31.0	54.7- 55.4	46.1		
61.4- 63.7	51.0	55.4- 59.2	24.3		
63.7- 65.5	53.2	59.2- 68.9	23.8		
65.5- 69.8	35.8	68.9- 71.8	37.7		
69.8- 72.5	14.0	71.8- 76.0	50.8		
72.5- 85.7	15.3	76.0- 86.3	61.4		
85.7- 89.5	32.1	86.3- 87.0	46.1		
89.5- 92.4	55.9	87.0- 92.9	30.3		
92.4-101.1	68.6	92.9- 93.7	28.2		
101.1-106.1	100.2	93.7- 95.0	30.1		
106.1-110.3	108.9	95.0- 98.2	66.8		
110.3-115.0	61.6	98.2-101.3	108.9		
115.0-120.1	57.2	101.3-105.6	25.1		
120.1-124.3	37.5	105.6-109.2	43.1		
124.3-130.1	30.1	109.2-113.2	39.2		
130.1-135.1	52.2	113.2-114.0	29.2		
135.1-140.5	70.9	114.0-114.8	16.7		
140.5-145.3	54.2	114.8-117.7	12.8		
145.3-149.1	48.9	117.7-121.9	23.3		
149.1-155.3	72.0	121.9-122.7	66.7		
155.3-160.2	22.6	122.7-124.3	129.2		
160.2-162.0	43.1	124.3-130.2	133.1		
162.0-165.4	65.9	130.2-134.5	85.6		
165.4-170.3	62.6	134.5-137.7	66.6		

# RAM HARDNESS

100 80 60 40 20 0  
TEMPERATURE, °C -30 -20 -10

0 STRATIGRAPHIC  
0 PROFILE 2

DENSITY 0.4 0.6 0.8

STATION Ross Ice Shelf  
Traverse Site 2h.0  
DATE 31 Dec 57 TIME 2  
LOCATION 81°01'S  
171°05'W  
OBSERVERS Boyd

## STRATIGRAPHIC SYMBOLS

\*\*\*\* New snow, recognizable crystals.  
\*\*\*\* Old snow, finegrained.  
\*\*\*\* Old snow, angular grains coarse.

\*\*\*\* Old snow, rounded grains coarse.

\*\*\*\* Sublimation crystals.

\*\*\*\* Ice layer.

\*\*\*\* Ice lens.

\*\*\*\* Ice gland.

\*\*\*\* Crust.

## HARDNESS

\*\*\*\* Soft (4 fingers)

XXXX Medium (1 finger)

XXXX Hard (pencil)

XXXX Very hard (knife)

DEPTH, M.

DEPTH, M.

GRAIN SIZE, mm.

183.7  
238.4  
291.4

141.2  
214.2  
147.2-2  
264.2  
337.4  
224.2

139.5  
176.2  
193.3  
198.5  
204.2  
454.2  
624.2  
219.2

3

3

3

Ross Ice Shelf Traverse  
 Station Site 24.0  
 Date 31 December 1957  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.8			Slight crust at 1.8; crystal plates intact; new fallen snow 5-6 mm
1.8- 5.5	.5-.7/.3-.5 occ. .8	3:1	
5.5- 5.6			Crust
5.6- 11.1	.3-.5/.5-.7	3:1	
11.1- 12.7	.5-.8/.3-.5=1.0	4:1	
12.7- 14.1	1.0-1.1/.8=1.0-1.3	2:1	
14.1- 14.2			Crust
14.2- 23.7	.6-.8/.4-.6 occ. 1.0	4:1	
23.7- 25.5	.3-.5/.5-.7	3:1	Slight crust at 25.5
25.5- 26.9	.5-.7/.3-.5 occ. .8	3:1	
26.9- 28.0	1.0-1.3/.8=1.0	2:1	
28.0- 29.6	.5-.7/.1-.2	3:1	
29.6- 32.6	.2-.3/.5-.7	3:1	
32.6- 37.9	1.1-1.3/1.5	5:1	
37.9- 40.6	1.3-1.5/1.0-1.3	2:1	Loose; some cup shaped crystals
40.6- 45.8	.3-.5/.1-.3 occ. .7	4:1	Hard packed
45.8- 46.2	.5-.7/.3-.5 occ. .1	2:1	Hard packed
46.2- 50.9	.7-1.0/.5-.7 occ. .3	2:1	Hard packed
50.9- 58.4	.3-.5/.5-.7	3:1	
58.4- 65.2	1.3-1.5/1.1-1.3	2:1	Some cup shaped crystals; loose
65.2- 67.7	.5-.7/.3-.5 occ. 1.0	4:1	
67.7- 69.2	.3-.5/.5-.7 occ. 1.0	3:1	
69.2- 69.3			Crust
69.3- 71.8	1.0-1.2/.8=1.0	3:1	Cemented
71.8- 73.2	1.3-1.5/1.5-1.7 occ. 1.0	2:1	Some cup shaped crystals
73.2- 77.1	1.1-1.3/.8=1.0 occ. 1.5	4:1	
77.1- 84.3	1.1-1.3/1.3-1.6 occ. 1.8	2:1	
84.3- 88.6	1.5-1.7/1.3-1.5 occ. 1.0	4:1	
88.6- 92.8	1.1-1.3/.8=1.0; 1.3-1.5	2:1	
92.8-101.2	1.2-1.4/1.0-1.2; 1.4-1.6	3:1	
101.2-105.4	1.3-1.5/1.5-1.7 occ. 2.0	2:1	Loose grains
105.4-111.6	1.1-1.3/.8=1.0 occ. 1.5	4:1	Slight crust from 105.4-105.6
111.6-114.2	1.1-1.4/1.5-1.7; 1.0	5:1	
114.2-117.3	1.2-1.4/.8; 1.0-1.2	3:1	Crust from 114.2-114.3
117.3-121.8	1.3-1.5/1.5-1.7; 1.1-1.3 occ. 2.0	3:1	
121.8-125.8	.8-1.0/1.1-1.3; .6	4:1	
125.8-129.2	.8-1.1/.6-.8; 1.1-1.3 occ. 1.4	2:1	

Ross Ice Shelf Traverse  
Station Site 24.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
129.2-131.2	1.1-1.3/.8-1.1 occ. 1.4	3:2	
131.2-135.5	.7-1.0/.5-.7; 1.0-1.2	3:1	Crust from 35.5-35.6; very irregular in depth
135.5-147.5	.6-.8/.8-1.1; .5-.6 occ. 1.3	3:1	
147.5-151.0	1.1-1.3/.8-1.0; 1.3-1.5	4:1	
151.0-154.3	.8-1.1/1.1-1.3 occ. 1.5	3:1	Crust from 154.3-154.4
154.3-157.5	.6-.9/1.0-1.2	4:1	
157.5-161.4	1.0-1.2/.8-1.0-1.4	6:1	Slight crust at 161.4
161.4-163.2	1.2-1.4/1.0-1.2 occ. 1.6	3:1	
163.2-166.3	1.0-1.2/1.2-1.4; .8	3:1	Crust from 166.3-166.4
166.3-168.8	1.5-2.3/2.3-3.1; 1.3-1.5	3:1	Air spaces; some cup shaped crystals
168.8-172.1	1.1-1.3/1.3-1.5; .8-1.1	3:1	
172.1-178.0	1.0-1.2/.8-1.0-1.4	4:1	Hard packed
178.0-179.4	1.2-1.4/1.4-1.6; 1.0-1.2	5:1	Some air spaces
179.4-183.5	1.1-1.3/.8-1.1-1.5	3:1	
183.5-192.2	1.1-1.3/.8-1.1-1.5	4:1	
192.2-195.5	1.0-1.2/.8-1.2-1.4	3:1	Crust at 195.5
195.5-201.2	.8-1.0/1.0-1.2	3:1	
201.2-203.7	1.1-1.3/.8-1.1 occ. 1.5	2:1	
203.7-203.8			Crust
203.8-213.6	.8-1.0/1.0-1.2	4:1	Cemented
213.6-215.5	1.1-1.3		Well cemented
215.5-216.5			Ice layer
216.5-219.1	1.5-2.3/2.3-2.8	4:1	
219.1-219.6			Ice layer
219.6-222.9	1.6-2.3/2.3-3.1	4:1	
222.9-224.7	1.2-1.4		Cemented crust; becomes ice layer in parts
224.7-229.5	1.2-1.6/1.0-1.2-1.8	3:1	
229.5-231.9	1.1-1.3/1.3-1.6	2:1	Slight crust at 231.9
231.9-234.5	.8-1.0/1.0-1.2	3:1	
234.5-234.6			Crust
234.6-243.0	1.0-1.2/.8-1.0	3:1	
243.0-243.1			Crust
243.1-250.8	1.0-1.3/.7-1.0	2:1	
250.8-255.5	1.1-1.4/.8-1.1	3:1	
255.5-255.6			Crust
255.6-263.5	1.0-1.2/.8-1.0	3:1	
263.5-263.6			Crust
263.6-266.7	.7-1.0/1.0-1.2	4:1	
266.7-268.4	1.2-1.4/1.4-1.7	5:1	Slight crust at 268.4
268.4-271.9	.5-.7/.7-1.0	3:1	
271.9-278.5	1.2-1.4/1.0-1.2; 1.4-1.7	3:1	Crust at 271.9 and 272.0
278.5-282.8	1.0-1.2/.8-1.0	3:1	

Ross Ice Shelf Traverse  
 Station Site 24.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
282.8-282.9			Crust
282.9-286.9	.8-1.1/1.1-1.3	4:1	
286.9-291.2	1.1-1.4/.8-1.1; 1.4-1.6	3:1	
291.2-295.7	1.3-1.6/1.0-1.3 occ. 1.8	2:1	
295.7-295.8			Crust
295.8-300.0	1.5-2.2/2.2-2.8	3:1	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 24.2		139.2-145.3	127.2	61.0-66.3	48.5
January 2, 1958		145.3-149.8	104.2	66.3-74.8	32.6
0 - 4.1	3.4	149.8-152.3	52.2	74.8-81.5	56.9
4.1-5.8	15.0	152.3-158.8	38.0	81.5-88.4	30.7
5.8-9.4	47.7	158.8-161.8	77.6	88.4-90.2	19.9
9.4-13.1	51.9	161.8-164.9	23.6	90.2-91.0	15.7
13.1-15.4	124.9	164.9-168.8	45.2	91.0-94.5	14.6
15.4-19.2	198.2	168.8-170.1	73.5	94.5-96.7	25.9
19.2-22.3	196.7	170.1-173.4	131.5	96.7-100.1	74.8
22.3-23.7	110.3	173.4-175.4	79.2	100.1-103.0	121.4
23.7-26.2	75.2	175.4-180.2	60.4	103.0-109.9	120.2
26.2-30.4	50.9	180.2-184.0	77.9	109.9-115.4	64.2
30.4-30.8	28.2	184.0-186.2	104.2	115.4-117.6	86.0
30.8-34.5	41.0	186.2-187.7	270.8	117.6-122.8	85.0
34.5-41.0	46.3	187.7-189.1	683.2	122.8-125.1	147.7
41.0-44.9	44.3	189.1-190.0	226.3	125.1-130.2	176.7
44.9-49.0	44.7	190.0-191.2	137.7	130.2-135.8	147.2
49.0-52.3	51.7	191.2-192.7	104.2	135.8-137.7	235.4
52.3-57.6	48.5	192.7-195.1	129.2	137.7-139.8	504.2
57.6-61.4	50.6	195.1-199.8	125.5	139.8-143.0	285.3
61.4-62.0	36.5			143.0-148.3	117.4
62.0-65.0	33.2	Station 24.4		148.3-155.3	94.2
65.0-70.0	33.2	January 2, 1958		155.3-159.8	66.6
70.0-74.8	61.6	0 - 3.2	3.5	159.8-161.4	229.2
74.8-75.2	53.2	3.2-4.8	15.7	161.4-163.0	410.3
75.2-82.2	41.8	4.8-6.1	37.8	163.0-165.1	504.2
82.2-88.7	43.2	6.1-8.0	24.3	165.1-167.7	484.7
88.7-90.4	67.9	8.0-8.4	28.2	167.7-171.1	489.2
90.4-95.2	112.5	8.4-11.2	21.1	171.1-173.0	346.3
95.2-98.0	104.2	11.2-15.0	26.9	173.0-176.0	221.1
98.0-100.5	64.2	15.0-17.8	24.6	176.0-181.1	210.2
100.5-105.2	59.5	17.8-18.4	19.9	181.1-184.1	104.2
105.2-109.6	49.7	18.4-21.5	24.2	184.1-187.2	159.2
109.6-112.1	48.2	21.5-23.1	22.0	187.2-190.3	81.6
112.1-117.6	51.5	23.1-23.8	17.5	190.3-193.7	74.8
117.6-118.4	29.2	23.8-26.6	26.3	193.7-194.9	129.2
118.4-121.0	50.4	26.6-29.2	45.5	194.9-200.0	129.7
121.0-122.7	45.4	29.2-32.1	58.4		
122.7-123.2	24.2	32.1-34.4	29.3		
123.2-125.6	14.6	34.4-36.6	25.9		
125.6-127.3	13.0	36.6-38.2	90.7		
127.3-128.8	10.9	38.2-42.4	103.2		
128.8-130.5	10.1	42.4-45.6	97.0		
130.5-131.7	8.4	45.6-47.8	71.4		
131.7-133.6	17.4	47.8-54.7	90.2		
133.6-136.8	29.2	54.7-55.0	69.9		
136.8-139.2	79.2	55.0-61.0	48.2		



# RAM HARDNESS

100 80  
TEMPERATURE, °C

60  
-30

40  
-20

20  
-10

0 STRATIGRAPHIC  
0 PROFILE 2

DENSITY  
0.4 0.6 0.8

STATION Ross Ice Shelf  
 Traverse Site 25.0  
 DATE 2-3 Jan 58 TIME 2  
 LOCATION 84°25'S  
167°15'W  
 OBSERVERS Byrd

## STRATIGRAPHIC SYMBOLS

\*\*\* New snow, recognizable crystals.  
 O O O Old snow, finegrained.  
 S S S Old snow, angular grains coarse.  
 O O O Old snow, rounded grains coarse.  
 A A A Sublimation crystals.  
 Ice layer.  
 Ice lens.  
 Ice gland.  
 Crust.  
 HARDNESS  
 / / / Soft (4 fingers)  
 X X X Medium (1 finger)  
 / / / Hard (pencil)  
 X X X Very hard (knife)

DEPTH, M.

DEPTH, M.

GRAIN SIZE, mm.

132.8 -

147.0 -

127.2 -

2

222.3 -

176.9 -

175.7 -

272.2 -

404.2 -

248.4 -

125.7 -

3

2

2

3

3

Ross Ice Shelf Traverse  
 Station Site 25.0  
 Date 2-3 January 1958  
 Observer Boyd

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.0			New fallen snow with crust on top
1.0- 10.8	.8-1.0/.5-.8	3:1	
10.8- 17.3	1.0-1.2/.8-1.0 occ. .6	3:1	
17.3- 24.7	1.1-1.3/.8-1.0 occ. 1.5	3:1	
24.7- 30.1	1.2-1.4/1.0-1.2-1.5	3:1	
30.1- 34.2	1.3-1.6/1.1-1.3	2:1	
34.2- 35.2	.7-1.0/.5-.7	3:1	
35.2- 37.8	1.5-2.8		Loose; cup shaped crystals
37.8- 40.7	.6-.8/.4-1.0	5:1	Crust from 40.7-40.8
40.7- 55.8	1.3-1.6/1.6-1.8 occ. 2.0	3:1	
55.8- 55.9			Crust
55.9- 60.2	1.0-1.2/.8-1.0	3:1	
60.2- 64.0	1.1-1.3/.7-1.0	3:1	Crust from 60.2-60.3
64.0- 71.5	1.2-1.4/1.0-1.2 occ. 1.6	3:1	Crust from 64.0-64.1
71.5- 74.8	.7-1.0/.5-.7; 1.0-1.2	3:1	Crust from 71.5-71.6
74.8- 80.4	.5-.7/.7-1.0	3:1	Slight crust at 74.8
80.4- 82.7	.5-.7/.3 occ. .9	2:1	
82.7- 89.8	1.2-1.4/1.0-1.2 occ. .8	3:1	
89.8- 98.0	1.1-1.3/.9-1.1	2:1	
90.0- 98.1			Crust
98.1-101.5	1.3-1.6/1.1-1.3 occ. 1.8	2:1	Loose; some cup shaped crystals
101.5-106.2	.6-.8/1.0-1.2	3:1	Crust from 101.5-101.6
106.2-120.6	.7-1.0/.5-.7; 1.0-1.2	6:1	
120.6-122.1	1.3-1.6/1.1-1.3 occ. 1.8	2:1	Crust from 122.1-122.2
122.1-126.7	1.1-1.3/.7-1.0	2:1	
126.7-134.9	.7-1.0/.5-.7 occ. 1.2	3:1	
134.9-139.1	1.1-1.4/1.4-1.6 occ. 1.8	3:1	
139.1-139.2			Crust
139.2-145.5	.7-.9/.5-.7	2:1	
145.5-149.8	1.3-1.5/1.5-1.8	2:1	
149.8-156.6	1.7-2.4/2.4-3.2	3:1	Some cup shaped crystals
156.6-160.0	1.1-1.3/1.3-1.5	4:1	
160.0-161.6	1.2-1.4/1.0-1.2; 1.4-1.6	3:1	
161.6-166.3	.5-.7/.3	4:1	Hard packed
166.3-168.7	1.1-1.3/1.3-1.5 occ. .8	2:1	Crust at 168.7-168.9
168.7-172.1	1.0-1.2/.8-1.0; 1.4	3:1	
172.1-173.6	1.2-1.4/1.0-1.2	3:1	
173.6-177.8	1.3/1.0-1.3 occ. 1.5	2:1	
177.8-179.1	1.3-1.5/1.1-1.3	2:1	
179.1-182.1	1.3-1.7/1.1-1.3 occ. 2.0	3:1	
182.1-184.3	1.5-2.3/2.3-3.1	6:1	

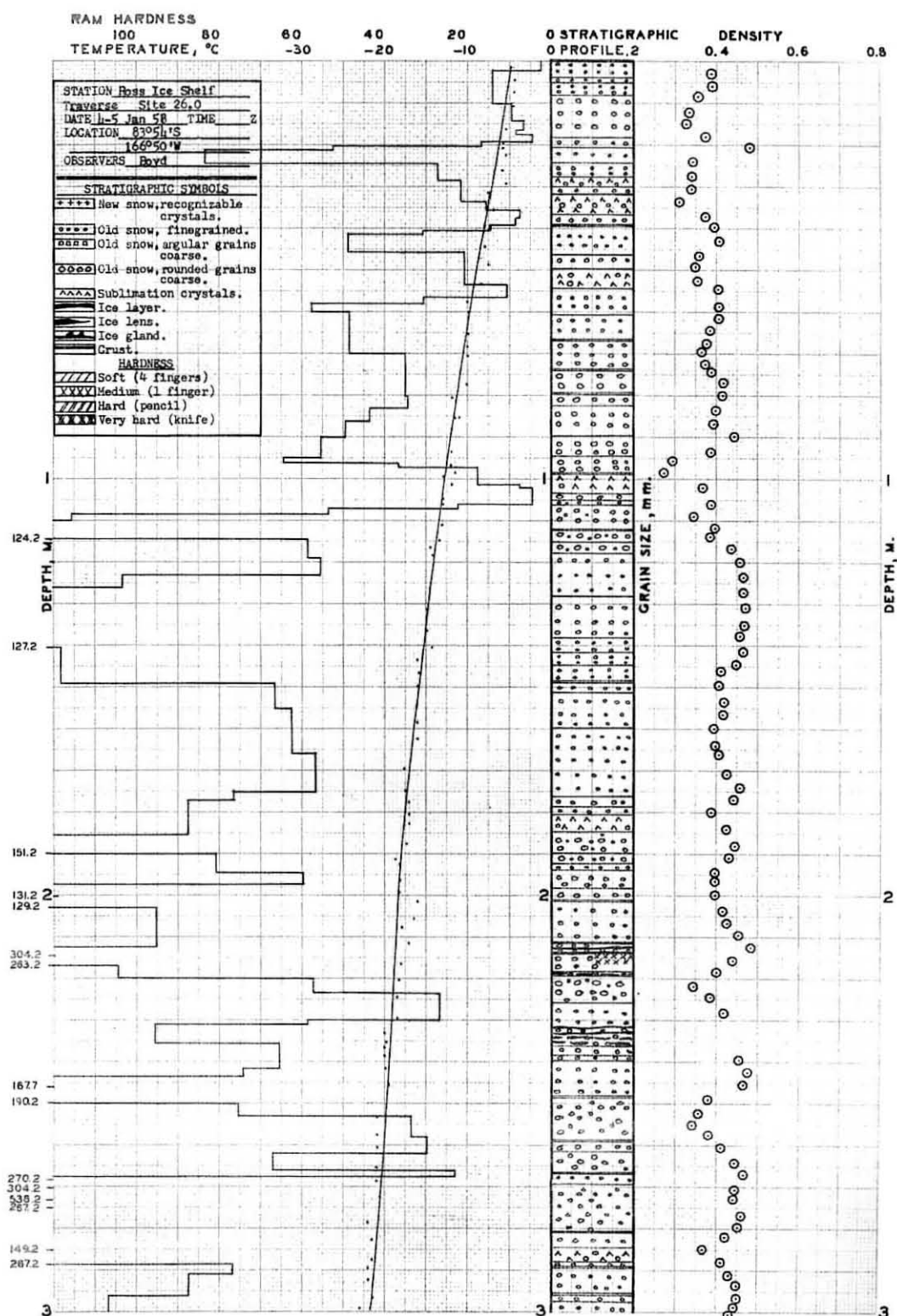
Ross Ice Shelf Traverse  
 Station Site 25.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
184.3-189.3	.8-1.0/1.0-1.2 occ. 1.4	3:1	
189.3-191.4	1.0-1.2/.7-1.0	3:1	Crust from 189.3-189.4
191.4-196.3	1.5-2.2/2.2-3.0	4:1	Loose
196.3-197.2	1.3-1.5		Bands of cemented grains
197.2-198.3			Ice layer
198.3-212.5	1.1-1.3/1.3-1.5	2:1	
212.5-212.7			Ice layer
212.7-215.5	1.1-1.3/1.3-1.5	3:1	Partially cemented
215.5-217.4			Ice layer and cemented grains
217.4-222.0	1.5-2.4/occ. 3.0	4:1	Some cup shaped crystals
222.0-224.8	.8-1.0/1.0-1.2	3:1	Cemented
224.8-226.1			Ice layer and cemented grains
226.1-229.7	1.3-1.5/1.5-1.7		Cemented
229.7-230.3			Ice layer
230.3-241.3	1.1-1.3/.8-1.5	4:1	Includes ice glands throughout
241.3-244.7	.7-1.0		Cemented grains
244.7-253.2	.8-1.1/1.1-1.3 occ. 1.5	2:1	
253.2-258.7	.5-.7/.8, .3	4:1	Cemented
258.7-261.7	1.2-1.4/1.0-1.2-1.6	3:1	
261.7-261.8			Crust
261.8-269.0	1.1-1.3/.7-1.0	4:1	
269.0-269.1			Crust
269.1-276.8	1.2-1.4/1.0-1.2	3:1	
276.8-285.5	1.1-1.3/1.0-1.4	3:1	
285.5-289.7	1.3-1.5/1.1-1.3	2:1	
289.7-294.7	1.3-1.6/1.6-1.8 occ. 2.0	4:1	
294.7-294.8			Crust
294.8-299.1	1.0-1.2/1.3-1.5	6:1	Cemented
299.1-	1.3-1.5/1.5-1.8 occ. 2.0	3:2	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 25.3		138.3-140.1	82.0	83.0- 87.2	60.5
January 4, 1958		140.1-141.3	20.9	87.2- 92.1	43.9
0 - 3.9	3.5	141.3-142.2	15.3	92.1- 94.0	83.2
3.9- 5.2	10.9	142.2-143.1	15.3	94.0- 99.0	70.2
5.2- 8.7	26.0	143.1-145.0	62.2	99.0-102.1	38.4
8.7- 10.4	15.0	145.0-150.3	91.0	102.1-104.1	44.2
10.4- 11.8	17.5	150.3-155.1	37.5	104.1-105.0	26.4
11.8- 12.3	63.2	155.1-163.6	70.1	105.0-106.2	12.6
12.3- 14.0	144.4	163.6-170.2	107.2	106.2-107.4	12.6
14.0- 17.0	153.2	170.2-176.0	92.2	107.4-110.7	5.7
17.0- 17.5	103.2	176.0-181.3	102.4	110.7-111.8	13.3
17.5- 19.1	40.7	181.3-187.1	92.1	111.8-113.8	39.2
19.1- 19.9	28.2	187.1-188.2	95.2	113.8-117.5	69.2
19.9- 21.9	15.7	188.2-193.1	114.3	117.5-119.4	25.3
21.9- 22.4	23.2	193.1-195.1	94.2	119.4-121.0	16.7
22.4- 25.8	10.6	195.1-196.5	161.4	121.0-124.7	16.4
25.8- 29.2	19.4	196.5-199.8	240.4	124.7-128.4	39.4
29.2- 31.8	34.0			128.4-133.0	65.2
31.8- 39.7	43.7	Station 25.5		133.0-139.8	52.7
39.7- 42.0	59.7	January 4, 1958		139.8-141.2	54.2
42.0- 46.0	15.7	0 - 3.7	3.5	141.2-145.0	77.9
46.0- 46.6	19.8	3.7- 5.9	26.0	145.0-150.2	79.2
46.6- 49.8	12.6	5.9- 10.5	42.4	150.2-160.1	70.9
49.8- 52.7	13.6	10.5- 10.9	28.2	160.1-168.3	65.2
52.7- 55.2	23.2	10.9- 13.0	22.3	168.3-172.7	40.6
55.2- 56.1	14.3	13.0- 14.5	29.8	172.7-174.2	84.2
56.1- 58.0	8.5	14.5- 19.1	52.1	174.2-180.6	110.4
58.0- 63.1	4.2	19.1- 25.2	36.0	180.6-182.1	164.2
63.1- 64.9	17.1	25.2- 25.8	19.9	182.1-184.2	122.2
64.9- 66.9	48.2	25.8- 30.6	24.0	184.2-184.9	75.7
66.9- 68.0	76.0	30.6- 36.0	19.9	184.9-185.6	47.0
68.0- 70.7	69.9	36.0- 40.2	22.2	185.6-186.5	37.6
70.7- 73.0	55.4	40.2- 44.1	34.0	186.5-189.0	32.2
73.0- 78.6	46.0	44.1- 46.0	76.8	189.0-190.5	84.2
78.6- 79.1	43.2	46.0- 49.0	83.2	190.5-192.0	191.0
79.1- 85.8	37.5	49.0- 49.6	53.2	192.0-195.2	176.2
85.8- 90.5	28.7	49.6- 55.2	47.8	195.2-197.6	108.2
90.5- 92.0	49.9	55.2- 58.3	32.2	197.6-199.9	117.2
92.0- 93.0	94.2	58.3- 61.0	18.0		
93.0- 96.4	74.8	61.0- 62.8	69.9		
96.4-100.9	37.5	62.8- 64.1	165.2		
100.9-109.9	50.9	64.1- 69.3	128.2		
109.9-119.6	80.0	69.3- 70.7	46.0		
119.6-127.8	106.7	70.7- 73.6	23.9		
127.8-134.8	101.4	73.6- 74.2	19.9		
134.8-137.8	44.2	74.2- 80.6	19.6		
137.8-138.3	64.2	80.6- 83.0	49.0		



Ross Ice Shelf Traverse  
 Station Site 26.0  
 Date 4-5 January 1958  
 Observer Boyd

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 3.9	.2-.3/.5, .1	3:1	Crust on top
3.9- 5.1	.5-.7/.3 occ. .8	2:1	Slight crust at 3.9
5.1- 8.1	.7-1.0/.5-.7 occ. .3	4:1	Slight crust at 8.1
8.1- 18.3	1.0-1.2/.8-1.0	3:2	Slight crust at 18.3
18.3- 20.4	.7-1.0/.5-.7	3:1	Slight crust at 20.4
20.4- 20.7	1.0-1.3/.7-1.0	2:1	
20.7- 24.1	.5-.7/.2-.5	3:2	Slight crust from 20.7-20.8; hard packed
24.1- 27.7	.6-.8/.4-.6-1.0	3:1	
27.7- 30.1	1.5-1.8/1.3-1.5	2:1	Loose; some cup shaped grains
30.1- 31.5	.8-1.1/1.1-1.3	4:1	
31.5- 31.6			Crust
31.6- 36.5	1.6-2.0/1.3-1.6	2:1	Loose; some cup shaped grains
36.5- 39.0	1.1-1.3/.7-1.0	2:1	
39.0- 39.1			Crust
39.1- 46.2	.7-.9/.5-.7	2:1	Slight crust at 46.2
46.2- 49.8	1.1-1.3/.8-1.1	2:1	Slight crust at 49.8
49.8- 49.9	.7-.9/.5-1.2	3:1	
49.9- 54.2	1.5-2.1/1.3-1.5	3:2	Loose; some cup shaped grains
54.2- 60.5	.8-1.0/.6-.8	2:1	
60.5- 66.5	1.1-1.3/.8-1.1	2:1	
66.5- 66.6			Crust
66.6- 73.7	1.3-1.5/1.1-1.3 occ. 1.7	2:1	
73.7- 73.8			Crust
73.8- 79.2	1.3-1.5/1.1-1.3	2:1	
79.2- 79.3			Crust
79.3- 82.5	1.1-1.3/1.3-1.6 occ. 1.8	2:1	
82.5- 82.6			Crust
82.6- 89.9	1.5-1.7/1.3-1.5 occ. 2.0	3:1	
89.9- 94.6	1.1-1.3/1.3-1.5	4:1	
94.6- 98.4	1.2-1.4/1.4-1.6 occ. 1.8	3:1	Slight crust at 98.4; slight cementing
98.4-103.3	2.3-3.5/3.5-5.6	2:1	Cup shaped crystals
103.3-105.1	1.2-1.5/1.0-1.2 occ. 1.7	3:1	
105.1-106.1	1.0-1.2/.8-1.0	3:1	
106.1-112.0	1.3-1.5/1.1-1.3	2:1	
112.0-112.1			Crust
112.1-115.0	1.0-1.2/.8-1.5	3:1	
115.0-117.8	1.1-1.3/.8-1.1; 1.3-1.5	2:1	
117.8-128.1	.8-1.0/1.0-1.2; .6-.8	5:1	
128.1-138.0	1.1-1.3/.8-1.1	2:1	
138.0-141.4	1.1-1.3/.8-1.0 occ. 1.5	5:1	
141.4-144.9	.5-.7/.7-1.0	2:1	



Ross Ice Shelf Traverse  
 Station Site 26.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
144.9-148.3	1.1-1.3/.8-1.1	3:1	
148.3-148.4			Crust
148.4-151.1	1.2-1.4/1.0-1.2	3:1	
151.1-159.8	1.0-1.2/.8-1.0 occ. 1.3	2:1	Slight crust at 159.8
159.8-176.0	1.0-1.2/.8-1.0	3:1	
176.0-178.4	1.0-1.2/.7-1.0-1.3	2:1	Slight crust at 178.4
178.4-180.3	.7-1.0/.5-.7; 1.1	3:1	
180.3-184.6	1.3-1.5/1.5-2.3	2:1	Slight crust from 180.3-180.4; some cup shaped crystals; loose
184.6-189.9	1.0-1.2/.7-1.0	3:1	Slight crust at 189.9
189.9-192.1	1.2-1.4/1.0-1.2 occ. 1.5	3:1	Slight crust from 192.1-192.2
192.1-193.8	1.1-1.3/.8-1.1	2:1	
193.8-198.1	1.2-1.3/1.0-1.2	3:1	
198.1-201.1	1.3-1.6/1.1-1.3	2:1	
201.1-201.2			Crust
201.2-211.1	1.0-1.2/.8-1.0	3:1	
211.1-211.2			Crust
211.2-212.5	1.1-1.3/1.3-1.5	4:1	
212.5-212.8			Ice layer
212.8-213.4	1.1-1.3/1.3-1.5	4:1	
213.4-213.6			Ice layer
213.6-218.1	1.5-1.8/1.8-2.3	2:1	Cemented
218.1-219.1	1.5-1.8/1.8-2.3	2:1	Cemented; ice layer
219.1-225.8	1.7-2.3/1.3-1.7	2:1	
225.8-231.9	.8-1.0/.6-1.1	3:1	
231.9-233.1			Ice layer
233.1-236.2	1.0-1.3/.8-1.0; 1.3-1.5	2:1	Slightly cemented
236.2-238.3	1.5-1.8/1.8-2.4 occ. 2.6	3:1	
238.3-239.8	1.1-1.3/1.3-1.5 occ. 1.7	2:1	
239.8-248.5	1.1-1.2/.7-1.0	3:1	
248.5-248.6			Crust
248.6-258.8	1.3-1.6/1.1-1.3 occ. 1.8	2:1	
258.8-258.9			Crust
258.9-261.7	1.2-1.4/1.0-1.2; 1.6-1.8	3:1	
261.7-266.2	1.1-1.3/.8-1.1 occ. 1.5	2:1	
266.2-266.3			Crust
266.3-269.3	.7-1.0/.5-.7; 1.2	3:1	
269.3-280.7	1.0-1.2/.8-1.0 occ. 1.4	3:1	
280.7-280.8			Crust
280.8-284.4	1.0-1.3/.8-1.0-1.5	2:1	
284.4-288.0	1.3-1.5/1.5-1.7 occ. 2.0	3:1	Loose; slight crust at 284.4; some cup shaped crystals
288.0-288.1			Crust
288.1-289.1	.8-1.0/1.0-1.2	3:1	
289.1-295.4	1.1-1.3/.8-1.1; 1.3-1.5	4:1	



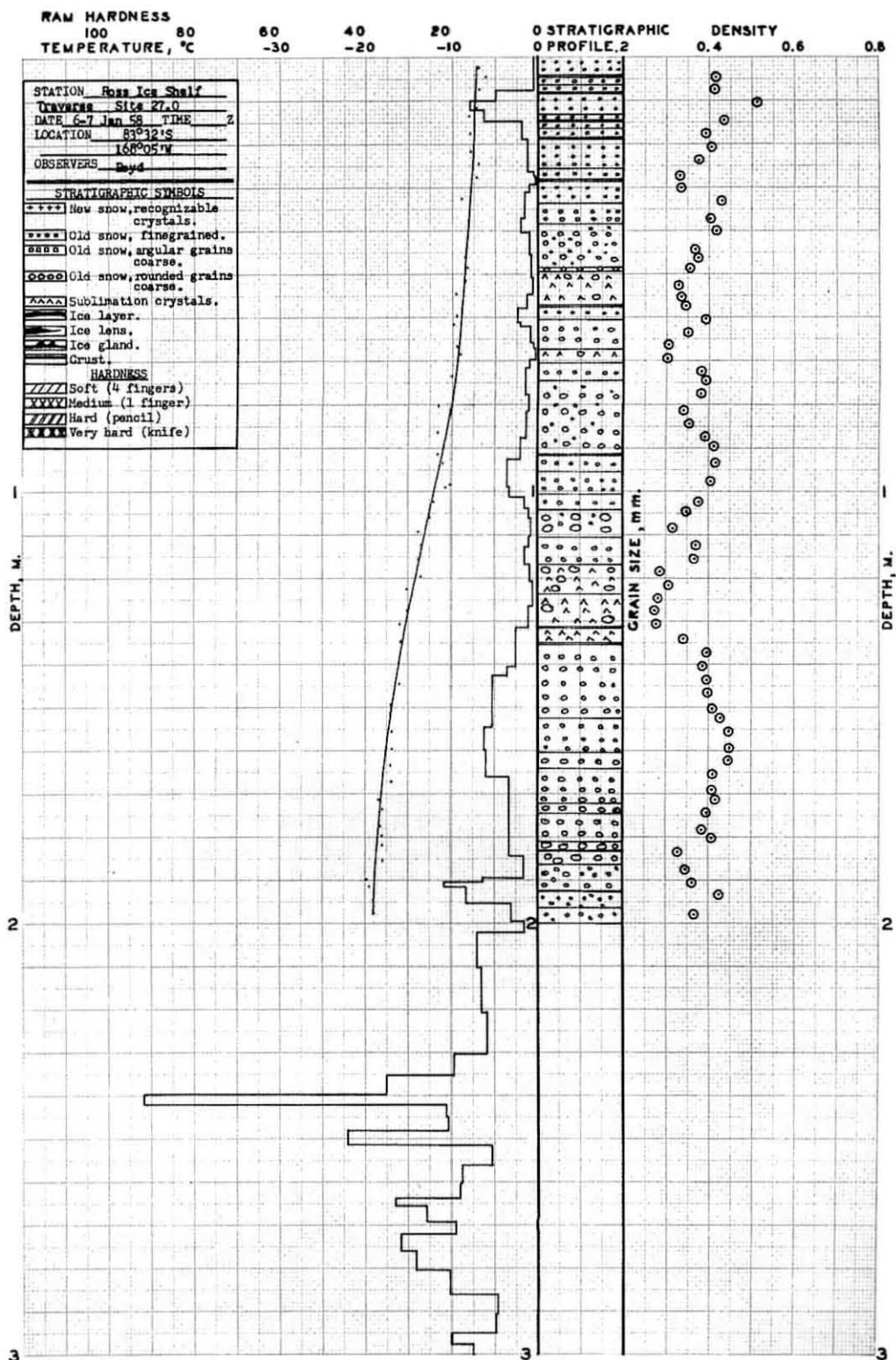
Ross Ice Shelf Traverse  
 Station Site 26.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
295.4-295.5			Crust
295.5-297.4	1.0-1.2/.8-1.0	3:1	Slight crust at 297.4
297.4	1.2-1.4/1.0-1.2 occ. .8	3:1	

## RAM HARDNESS DATA SHEET

 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 26.5		123.6-126.2	42.7		
January 7, 1958		126.2-127.1	15.3		
0 - 6.5	3.4	127.1-129.0	14.7		
6.5- 8.6	15.1	129.0-130.9	14.7		
8.6- 9.0	28.2	130.9-132.2	11.9		
9.0- 12.3	42.6	132.2-133.7	7.5		
12.3- 14.6	24.9	133.7-139.1	5.1		
14.6- 17.1	17.2	139.1-141.6	44.2		
17.1- 19.3	10.0	141.6-145.0	66.0		
19.3- 21.3	5.7	145.0-150.5	55.1		
21.3- 25.2	4.5	150.5-154.4	35.0		
25.2- 26.5	22.5	154.4-156.2	48.7		
26.5- 29.0	75.2	156.2-161.0	58.4		
29.0- 31.3	81.6	161.0-164.1	49.4		
31.3- 33.1	58.8	164.1-167.6	72.8		
33.1- 35.0	29.5	167.6-169.9	160.7		
35.0- 38.0	23.2	169.9-180.2	261.3		
38.0- 41.0	19.9	180.2-184.8	178.2		
41.0- 41.6	11.5	184.8-187.6	57.8		
41.6- 44.7	4.8	187.6-190.8	60.4		
44.7- 46.8	8.0	190.8-193.0	113.3		
46.8- 47.8	13.2	193.0-197.5	164.2		
47.8- 56.4	39.3	197.5-199.9	129.2		
56.4- 60.8	32.8				
60.8- 65.3	27.6				
65.3- 68.1	31.8				
68.1- 69.0	14.3				
69.0- 70.2	11.5				
70.2- 72.8	5.1				
72.8- 75.1	5.4				
75.1- 78.0	10.1				
78.0- 80.4	78.2				
80.4- 82.7	68.4				
82.7- 85.3	64.8				
85.3- 89.2	21.1				
89.2- 91.5	20.6				
91.5- 96.0	35.3				
96.0-100.5	46.4				
100.5-103.2	56.0				
103.2-103.8	37.5				
103.8-107.1	19.4				
107.1-108.8	10.1				
108.8-109.3	14.2				
109.3-112.3	34.2				
112.3-117.0	61.6				
117.0-120.2	41.7				
120.2-123.6	51.3				



Ross Ice Shelf Traverse  
 Station Site 27.0  
 Date 6-7 January 1958  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 4.7	.5-.7/.3-.5	3:1	Numerous wind crusts through- out
4.7- 6.1	.8-1.1/1.1-1.3	3:1	Crust from 4.7-4.8; loose
6.1- 8.0	.8-1.0/.6-.8	3:1	Crust from 8.0-8.1
8.0- 13.1	.5-.7/.3-.5	2:1	
13.1- 14.4	.5-.7/.1-.3	2:1	Crust from 14.4-14.5
14.4- 16.1	.3-.5/.1-.3	2:1	Slight crust 16.1
16.1- 18.7	.5-.7/.3-.5-.7-.9	4:1	Crust from 18.7-18.8
18.7- 25.4	.6-.8/.4-.6	3:1	
25.4- 28.6	.8-1.0/.6-.8 occ. 1.2	3:1	Crust from 28.6-28.7
28.6- 33.4	.3-.5/.7-.9	4:1	
33.4- 38.1	1.1-1.3/.8-1.0	2:1	Crust from 38.1-38.2
38.1- 48.4	1.3-1.5/1.1-1.3 occ. .8	3:1	
48.4- 49.2	1.5-1.7/1.3-1.5	2:1	Some cup shaped crystals
49.2- 57.4	1.5-1.7/1.8-2.0	3:1	Crust from 57.4-57.5; air space; cup shaped crystals; loose
57.4- 60.3	.2-.4/.4-.6	3:1	
60.3- 67.2	1.1-1.3/1.3-1.5	2:1	
67.2- 70.6	1.6-1.8/1.8-2.3	2:1	Air space; cup shaped crystals
70.6- 74.6	.6-.8/.8-1.0	4:1	
74.6- 91.3	1.2-1.4/.9-1.1; 1.4-1.6	3:1	Crust from 91.3-91.4
91.3- 95.6	.8-1.0/1.1-1.3	5:1	
95.6-100.4	.6-.8/.8-1.0	3:1	
100.4-104.1	.8-1.0/1.0-1.3	2:1	
104.1-110.6	1.5-2.5/1.0-1.3	2:1	
110.6-116.8	1.1-1.3/1.3-1.5	4:1	
116.8-123.8	1.5-2.1/2.1-3.8	3:1	Trace of crust; cup shaped crystals
123.8-131.4	2.0-5.0/1.5-2.0	3:1	Air space; cup shaped crystals; crust from 131.4-131.6
131.4-135.3	1.3-1.5/1.5-1.8 occ. 2.0	2:1	Crust from 135.3-135.4; cup shaped crystals
135.3-152.7	1.1-1.3/.8-1.1	3:1	
152.7-160.2	.8-1.0/1.0-1.3	2:1	
160.2-164.0	1.3-1.5/1.0-1.3; 1.5-1.7	2:1	
164.0-172.1	1.0-1.2/.8-1.0	3:2	Slight crust
172.1-174.5	1.3-1.5/1.0-1.3	4:1	Slight crust
174.5-181.0	1.1-1.4/.8-1.0	2:1	
181.0-183.1	1.3-1.5/1.0-1.3	2:1	Crust from 183.1-183.2
183.1-186.2	1.5-1.8/1.8-2.2	3:1	
186.2-192.4	1.0-1.2/.8-1.0; 1.2-1.4	3:1	Crust from 192.4-192.5
192.4-196.6	.7-1.0/.5-.7	2:1	Very hard packed
196.6-200.0*	1.1-1.3/.8-1.1		

## RAM HARDNESS DATA SHEET

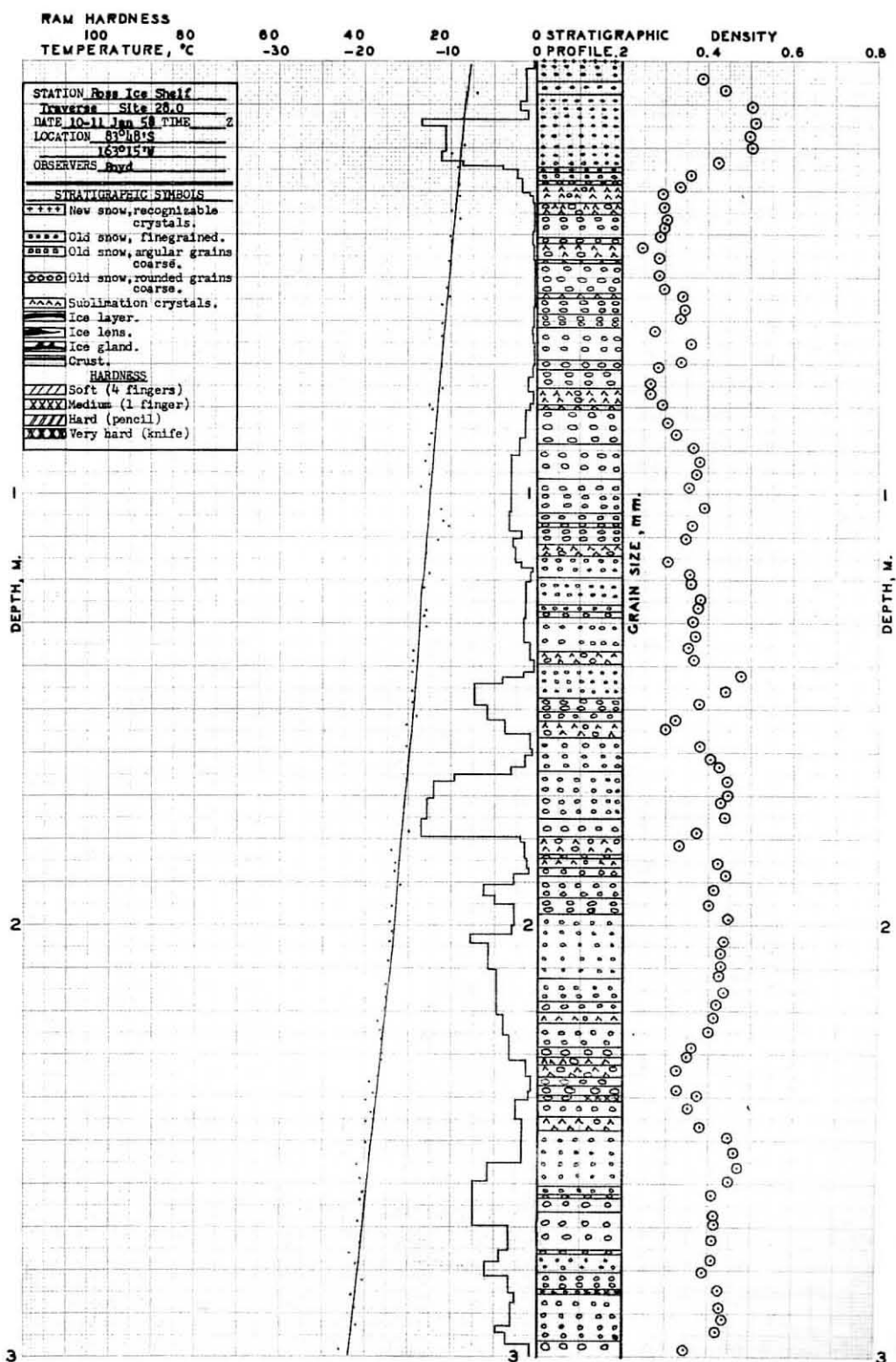
 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 27.2		132.2-134.5	39.0	55.4-59.5	21.5
January 9, 1957		134.5-137.3	61.4	59.5-63.7	34.2
0 - 4.2	3.4	137.3-141.3	69.2	63.7-67.6	16.0
4.2-5.5	10.9	141.3-150.2	65.0	67.6-69.5	14.8
5.5-8.8	9.3	150.2-154.5	92.6	69.5-72.3	12.1
8.8-9.5	10.3	154.5-157.4	128.4	72.3-74.8	23.2
9.5-11.3	6.0	157.4-162.3	77.6	74.8-80.8	38.2
11.3-17.7	4.0	162.3-168.9	86.0	80.8-83.6	21.0
17.7-18.4	10.3	168.9-174.1	96.6	83.6-86.0	28.2
18.4-20.2	8.8	174.1-176.7	62.0	86.0-91.4	31.0
20.2-22.3	8.0	176.7-178.3	29.2	91.4-96.8	25.4
22.3-24.5	12.3	178.3-179.9	23.0	96.8-98.0	111.4
24.5-28.7	24.6	179.9-183.1	19.8	98.0-99.0	244.2
28.7-30.1	67.4	183.1-184.0	61.4	99.0-101.0	454.2
30.1-35.6	65.1	184.0-187.9	73.4	101.0-103.0	429.2
35.6-39.7	25.2	187.9-189.9	19.2	103.0-104.1	322.2
39.7-42.1	24.0	189.9-191.7	15.3	104.1-105.2	186.2
42.1-45.7	11.5	191.7-193.6	12.1	105.2-107.0	115.2
45.7-48.4	10.6	193.6-195.1	20.9	107.0-109.2	86.1
48.4-52.2	5.8	195.1-197.7	38.8	109.2-113.0	56.8
52.2-54.1	13.7	197.7-199.9	72.4	113.0-117.0	61.7
54.1-60.6	32.4			117.0-119.8	97.2
60.6-67.7	24.3			119.8-120.2	54.2
67.7-70.1	32.4	Station 27.5		120.2-121.9	27.8
70.1-73.2	80.6	January 9, 1957		121.9-122.3	29.2
73.2-73.9	31.8	0 - 3.2	3.5	122.3-123.5	20.9
73.9-74.9	23.2	3.2-4.8	15.7	123.5-124.8	11.9
74.9-80.3	32.8	4.8-8.4	31.0	124.8-126.0	12.5
80.3-85.7	21.7	8.4-9.2	28.2	126.0-127.0	9.2
85.7-88.3	22.4	9.2-11.5	22.8	127.0-129.0	6.7
88.3-89.5	94.8	11.5-15.8	21.8	129.0-131.1	6.6
89.5-90.6	81.8	15.8-18.2	19.9	131.1-132.3	16.7
90.6-93.0	116.5	18.2-19.8	12.6	132.3-137.9	47.1
93.0-95.1	75.6	19.8-21.3	9.9	137.9-140.4	88.2
95.1-95.7	54.2	21.3-22.8	9.9	140.4-146.4	107.2
95.7-101.3	52.6	22.8-23.7	8.8	146.4-151.6	90.7
101.3-106.0	68.0	23.7-27.0	4.7	151.6-159.0	85.2
106.0-110.5	124.2	27.0-28.8	6.0	159.0-161.0	124.2
110.5-113.3	57.8	28.8-30.3	9.9	161.0-163.1	118.2
113.3-115.4	23.3	30.3-35.1	22.0	163.1-165.4	95.6
115.4-119.3	19.6	35.1-40.5	31.0	165.4-165.8	79.2
119.3-121.7	29.2	40.5-42.2	109.2	165.8-176.9	56.5
121.7-125.3	34.8	42.2-43.6	74.6	176.9-185.4	48.9
125.3-127.0	16.0	43.6-45.6	43.2	185.4-189.1	66.4
127.0-128.5	7.5	45.6-49.4	47.9	189.1-191.3	95.2
128.5-131.9	5.7	49.4-51.2	17.1	191.3-193.2	193.7
131.9-132.2	20.9	51.2-53.2	15.7	193.2-199.9	153.4
		53.2-55.4	16.8		

## RAM HARDNESS DATA SHEET

 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 27.7		114.0-115.2	70.9		
January 9, 1958		115.2-118.3	81.6		
0 - 4.1	3.4	118.3-121.8	72.8		
4.1- 5.6	13.2	121.8-123.1	35.0		
5.6- 10.8	18.6	123.1-123.5	29.2		
10.8- 12.8	13.2	123.5-124.5	14.2		
12.8- 13.6	9.5	124.5-124.9	16.7		
13.6- 15.3	9.1	124.9-125.8	9.8		
15.3- 17.2	11.1	125.8-128.3	6.2		
17.2- 20.3	16.2	128.3-136.0	4.9		
20.3- 24.5	29.4	136.0-136.4	16.7		
24.5- 27.0	27.2	136.4-138.1	30.7		
27.0- 30.4	41.4	138.1-143.8	51.6		
30.4- 35.0	33.7	143.8-150.7	85.4		
35.0- 37.2	21.4	150.7-155.6	102.2		
37.2- 40.3	19.3	155.6-160.7	94.4		
40.3- 43.9	17.1	160.7-163.6	87.0		
43.9- 49.1	16.7	163.6-169.8	71.9		
49.1- 50.6	9.9	169.8-175.5	46.3		
50.6- 52.1	9.9	175.5-181.4	34.7		
52.1- 53.7	9.5	181.4-183.8	33.4		
53.7- 55.6	29.5	183.8-190.7	82.4		
55.6- 57.0	88.8	190.7-195.6	108.3		
57.0- 58.6	109.4	195.6-199.6	69.2		
58.6- 61.2	118.6	199.6-200.0	79.2		
61.2- 62.1	58.8				
62.1- 63.8	38.5				
63.8- 65.1	18.6				
65.1- 68.7	17.1				
68.7- 70.1	28.2				
70.1- 72.4	33.6				
72.4- 76.4	25.7				
76.4- 81.3	25.6				
81.3- 85.3	28.2				
85.3- 87.2	45.3				
87.2- 90.3	100.0				
90.3- 92.2	50.6				
92.2- 95.6	42.4				
95.6-100.1	62.0				
100.1-101.6	164.2				
101.6-104.1	384.2				
104.1-105.4	312.2				
105.4-105.7	170.7				
105.7-107.8	104.2				
107.8-110.3	60.2				
110.3-114.0	39.3				





Ross Ice Shelf Traverse  
 Station Site 28.0  
 Date 10-11 January 1958  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.1	3.0-5.0		Crust of flakes; new snow on surface
0.1- 4.4	.5-.7/.2-.5	3:1	Slight crust
4.4- 7.4	.7-1.0/.5-.7	3:1	
7.4- 24.6	.3-.5/.5-.7	2:1	Crust from 7.4-7.5
24.6- 25.3	.7-1.0/.5-.7; 1.0-1.2	3:1	Slight crust
25.3- 27.8	.8-1.0/1.0-1.2	3:1	
27.8- 28.1	1.0-1.3/.8-1.0; 1.3-1.5	2:1	Crust from 28.1-28.2
28.1- 32.5	1.5-1.8/1.3-1.5	2:1	Slight crust; cup shaped crystals
32.5- 35.1	1.5-2.0/1.3-1.5; 2.0-2.5	2:1	Loose; cup shaped crystals
35.1- 40.9	1.2-1.4/1.4-1.6 occ. 1.8	3:1	Crust from 40.9-41.0
40.9- 42.0	1.0-1.3/.8-1.0	2:1	Slight crust
42.0- 45.8	2.0-3.5/3.5-5.0	2:1	Slight crust; cup shaped grain
45.8- 46.7	3.0-10.0		Cup shaped; air space with loose crystals
46.7- 53.6	1.6-2.0/1.2-1.6	2:1	
53.6- 54.8	3.0-6.0		
54.8- 58.3	1.0-1.3/.8-1.0	2:1	
58.3- 61.4	1.2-1.4/1.4-1.6 occ. 2.0	3:1	
61.4- 69.0	1.0-1.3/.7-1.0	3:2	Crust 61.4-61.5
69.0- 71.2	1.0-1.3/1.3-1.6	4:1	
71.2- 75.4	1.5-2.0/2.0-2.5	3:1	
75.4- 79.2	2.0-4.0/4.0-5.5	3:1	Remnant of crust; cup shaped; loose
79.2- 80.2	5.0-10.0		Cup shaped
80.2- 88.2	1.5-1.8/1.2-1.5	3:1	
88.2- 96.3	1.2-1.4/1.4-1.7	3:1	
96.3-104.3	1.0-1.3/1.3-1.6	2:1	Crust from 96.3-96.4
104.3-106.5	1.0-1.3/.8-1.0 occ. 1.5	3:1	Crust from 104.3-104.4
106.5-107.2	1.3-1.5/1.5-1.7; 1.0-1.3	4:1	
107.2-111.6	1.5-1.7/1.3-1.5; 1.7-2.0	3:1	
111.6-114.1	1.9-2.0/1.5-1.7	2:1	Cup shaped crystals; loose
114.1-119.3	1.0-1.2/1.2-1.4; .8-1.0	3:1	
119.3-125.7	.8-1.0/1.0-1.2	2:1	Crust from 119.3-119.4
125.7-127.1	.8-1.0/1.0-1.3 occ. 1.5	3:1	Crust from 125.7-125.8
127.1-128.7	1.2-1.5/1.0-1.2	2:1	
128.7-136.4	1.0-1.3/.8-1.0 occ. 1.5	4:1	
136.4-137.6	3.0-8.0		Cup shaped; air spaces; loose grains
137.6-147.1	.7-1.0/.5-.7; 1.0-1.2	5:1	Very hard packed
147.1-150.3	1.3-1.5/1.0-1.3 occ. 1.9	3:1	
150.3-152.7	1.0-1.2/.8-1.0 occ. 1.4	3:1	Crust from 152.7-152.8

Ross Ice Shelf Traverse  
 Station Site 28.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
152.7-156.2	2.0-6.0/6.0-8.0 occ. 10.0	3:1	Loose grains with air spaces; cup shaped grains
156.2-164.1	1.0-1.3/.8-1.0; 1.3-1.5	4:1	Crust from 164.1-164.2
164.1-175.1	1.0-1.3/.7-1.0	2:1	Crust from 175.1-175.2; this is ice layer
175.1-179.5	1.3-1.5/1.0-1.3	2:1	Slight cemented layer
179.5-183.4	1.5-1.7/1.7-2.0	3:1	Crust of cemented grains; loose grains
183.4-184.3	1.3-1.5/1.5-1.7	3:1	
184.3-186.6	1.7-2.0/2.0-3.5; 1.5-1.7	3:1	
186.6-188.5	1.2-1.4/1.0-1.2; 1.4-1.6	2:1	
188.5-193.7	1.0-1.3/.8-1.0 Very occ. 1.5	2:1	
193.7-197.3	1.5-1.7/1.7-2.0; 1.3-1.5	4:1	Fairly loose grains
197.3-212.2	.7-1.0/.5-.7 occ. 1.2	3:1	
212.2-217.9	1.0-1.2/.8-1.0	2:1	Slight crust at 217.9
217.9-220.2	1.2-1.4/1.0-1.2; 1.4-1.7	5:1	
220.2-222.7	1.5-1.7/1.3-1.5	4:1	Some cup shaped; crust from 222.7-222.8
222.7-228.3	1.2-1.4/1.4-1.7 occ. 2.0	3:1	
228.3-230.4	1.5-2.0/2.0-2.5; 1.3-1.5	5:1	
230.4-232.4	2.0-2.5/1.7-2.0	3:1	Slightly cemented; some cup shaped crystals
232.4-235.1	2.0-3.0/1.5-2.0	2:1	Cup shaped; loose
235.1-237.3	1.5-2.0/1.3-1.5; 2.0-2.3	4:1	
237.3-239.5	2.0-3.5/1.5-2.0	3:1	Aggregate of crystals
239.5-240.8	2.0-3.0		Cemented with air spaces
240.8-244.3	1.0-1.2/.8-1.0 occ. 1.4	3:1	Cemented for first centimeter
244.3-247.8	2.5-3.5/1.5-2.0	2:1	Cup shaped; loose
247.8-260.6	.8-1.0/1.0-1.2	3:1	
260.6-262.5	1.0-1.3/.8-1.0	2:1	
262.5-263.3	1.1-1.4/.8-1.0 occ. 1.6	3:1	
263.3-266.6	1.3-1.5/1.0-1.3	2:1	Slight crust at 266.6
266.6-275.2	1.2-1.4/1.4-1.6; 1.0-1.2	3:1	
275.2-276.2	1.0-1.3/1.3-1.5 occ. 1.7	2:1	
276.2-280.4	.7-1.0/.5-.7	3:2	Hard packed
280.4-284.3	1.3-1.5/1.0-1.3 occ. 1.7	2:1	Crust from 284.3-284.4
284.3-285.5	.7-1.0/1.0-1.2	3:1	Cemented
285.5-296.1	1.0-1.3/1.3-1.5; .8-1.0	2:1	
296.1-300.0+	1.5-1.8/1.3-1.5 occ. 2.0	3:1	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 28.12		141.8-144.2	49.0	80.1- 86.6	26.3
January 13, 1957		144.2-148.5	59.0	86.6- 88.8	16.8
0 - 1.1	3.1	148.5-153.1	114.2	88.8- 90.7	14.7
1.1- 5.5	127.2	153.1-159.2	101.6	90.7- 95.3	25.9
5.5- 9.6	234.2	159.2-161.8	100.2	95.3- 98.3	27.5
9.6- 11.6	377.2	161.8-164.3	35.2	98.3-100.2	14.7
11.6- 14.1	402.2	164.3-168.1	24.3	100.2-102.4	13.3
14.1- 16.2	311.2	168.1-175.6	48.6	102.4-104.2	20.9
16.2- 19.3	307.2	175.6-178.8	34.4	104.2-109.3	31.6
19.3- 23.5	240.2	178.8-179.2	28.2	109.3-110.3	14.2
23.5- 26.2	261.2	179.2-180.6	17.5	110.3-113.2	7.7
26.2- 28.0	113.2	180.6-183.0	11.5	113.2-117.8	6.4
28.0- 29.9	81.2	183.0-185.3	16.3	117.8-118.1	7.5
29.9- 32.4	62.2	185.3-187.5	39.6	118.1-121.1	30.9
32.4- 34.7	19.6	187.5-190.8	45.6	121.1-126.3	31.1
34.7- 36.8	11.7	190.8-195.3	32.1	126.3-129.3	24.2
36.8- 39.8	8.9	195.3-200.0	35.1	129.3-130.7	32.8
39.8- 40.8	7.2			130.7-133.8	23.6
40.8- 46.3	3.1	Station 28.19		133.8-134.7	15.3
46.3- 47.4	6.7	January 14, 1957		134.7-136.4	10.1
47.4- 56.5	2.8	0 - 5.2	3.4	136.4-139.4	10.7
56.5- 60.0	3.6	5.2- 10.8	14.8	139.4-143.7	13.5
60.0- 62.0	12.2	10.8- 14.1	15.3	143.7-146.0	12.9
62.0- 69.1	27.1	14.1- 18.0	12.2	146.0-149.8	25.3
69.1- 71.8	58.8	18.0- 18.8	9.5	149.8-152.7	31.8
71.8- 78.3	77.1	18.8- 21.2	11.5	152.7-157.2	22.0
78.3- 79.6	34.0	21.2- 23.0	14.3	157.2-160.1	11.1
79.6- 82.6	29.9	23.0- 25.2	16.8	160.1-161.1	34.2
82.6- 84.6	33.2	25.2- 27.1	40.0	161.1-162.0	59.8
84.6- 87.1	15.2	27.1- 30.2	54.8	162.0-164.3	108.6
87.1- 90.5	15.0	30.2- 34.7	36.5	164.3-171.7	101.5
90.5- 93.4	22.2	34.7- 36.6	13.7	171.7-177.7	44.2
93.4- 96.0	26.3	36.6- 39.9	9.3	177.7-184.1	54.2
96.0-101.3	29.6	39.9- 41.7	9.5	184.1-188.1	54.2
101.3-106.8	54.1	41.7- 43.1	6.8	188.1-190.8	48.7
106.8-110.8	93.2	43.1- 47.0	4.5	190.8-194.7	19.6
110.8-115.2	94.2	47.0- 48.0	33.2	194.7-199.8	27.7
115.2-119.0	76.9	48.0- 50.2	39.5		
119.0-120.8	53.2	50.2- 56.7	4.7		
120.8-123.0	21.4	56.7- 58.3	28.2		
123.0-124.4	17.5	58.3- 60.3	53.2		
124.4-126.9	15.2	60.3- 65.3	31.2		
126.9-127.8	14.3	65.3- 69.0	49.2		
127.8-130.1	16.3	69.0- 72.0	59.9		
130.1-134.1	23.2	72.0- 75.0	89.9		
134.1-137.6	37.5	75.0- 77.3	38.0		
137.6-141.8	24.6	77.3- 80.1	13.9		

# RAM HARDNESS

100 80  
TEMPERATURE, °C

60 -30

40 -20

20 -10

0 STRATIGRAPHIC  
0 PROFILE. 2

DENSITY  
0.4 0.6 0.8

STATION Ross Ice Shelf  
Traverse Site 29.0  
DATE 19-20 Jan 58 TIME 2  
LOCATION 83°10'S  
163°30'W  
OBSERVERS Byrd

## STRATIGRAPHIC SYMBOLS

\*\*\*\* New snow, recognizable crystals.  
\*\*\*\* Old snow, finegrained.  
\*\*\*\* Old snow, angular grains coarse.  
\*\*\*\* Old snow, rounded grains coarse.  
\*\*\*\* Sublimation crystals.  
Ice layer.  
Ice lens.  
Ice gland.  
Crust.

## HARDNESS

Soft (4 fingers)  
Medium (1 finger)  
Hard (pencil)  
Very hard (knife)

168.6  
190.7

DEPTH, M.

2

174.5 -  
148.7 -

137.6 -

3

GRAIN SIZE, mm.

DEPTH, M.

2

3

Ross Ice Shelf Traverse  
 Station Site 29.0  
 Date 17 January 1958  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.2	5.0-10.0		Usually in groups; new snow; crystal plates have undergone change to form solid hexagons instead of usual dendritic forms
1.2- 2.7	3.0-5.0		Finer hexagon crystals; some are granules not crystals
2.7- 3.9	2.0-5.0		Prisms; loose with air space; slight crust exists 3.9
3.9- 5.4	2.5-5.0		Cup shaped crystals
5.4- 7.4	.1-.3/.3-.5	2:1	Slight crust at 7.4
7.4- 8.8	.3-.5/.1-.3 occ. .7	3:1	Crust from 8.8-8.9
8.8- 12.3	.5-.7/.3-.5	2:1	
12.3- 12.9	.7-1.0/occ. 1.2	3:1	Air space with loose groups; crust from 12.9-13.0
12.9- 17.2	.3-.5/.5-.7 occ. 1.0	3:1	
17.2- 23.2	.8-1.0/.6-.8-1.2	2:1	Loose
23.2- 24.8	1.0-1.3/.7-1.0 occ. 1.5	3:1	
24.8- 26.3	.5-.7/.3-.5 occ. 1.0	4:1	Crust from 26.3-26.4
26.3- 26.9	1.0-1.2/.8-1.0 occ. 1.4	3:1	
26.9- 27.6	1.0-1.3/1.3-1.5	3:1	Air spaces
27.6- 33.7	1.0-1.2/1.2-1.4; .7-1.0	5:1	
33.7- 39.8	1.5-1.7/1.3-1.5 occ. 1.0	3:1	
39.8- 41.1	3.0-5.5/5.5-7.0	2:1	Air spaces; cup shaped; loose
41.1- 44.2	3.0-5.0/5.0-7.0 occ. 2.0	4:1	Cup shaped; loose; crust from 44.2-44.3
44.2- 45.0	1.0-1.2/.8-1.0	2:1	Slightly cemented
45.0- 47.7	1.2-1.5/1.0-1.2	3:1	Loose
47.7- 49.5	2.0-5.0/5.0-8.5	3:1	Loose; cup shaped crystals
49.5- 53.1	1.5-2.0/2.0-4.0	2:1	Loose grains
53.1- 55.8	2.0-3.0/3.0-6.0	4:1	Loose
55.8- 69.8	.5-.7/.3-.5 occ. 1.0	3:1	Hard packed
69.8- 73.0	1.0-1.3/.8-1.0 occ. 1.5	4:1	
73.0- 74.5	1.5-2.5/2.5-5.0	3:1	Fairly compact; cup shaped
74.5- 83.7	1.0-1.3/.8-1.0; 1.3-1.5	4:1	
83.7- 86.5	.7-1.0/.5-.7 occ. 1.2	3:1	
86.5- 89.5	3.0-5.0/5.0-8.0	2:1	Loose; crust from 89.5-89.7; cup shaped crystals
89.5- 92.6	1.0-1.3/1.3-1.5 occ. 1.7	3:1	Crust from 92.6-92.7
92.6- 98.1	1.0-1.3/.8-1.0 occ. 1.5	4:1	
98.1-106.5	3.0-5.0/1.0-3.0 occ. 7.0	3:1	Loose; cup shaped crystals
106.5-119.4	1.1-1.3/1.3-1.5; .8-1.1	4:1	
119.4-122.2	1.3-1.5/1.0-1.3	2:1	

Ross Ice Shelf Traverse  
 Station Site 29.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
122.2-128.1	.8-1.0/1.0-1.3	3:1	
128.1-130.1	1.5-1.7/1.3-1.5	3:1	
130.1-135.8	1.0-1.2/.8-1.0	2:1	
135.8-143.2	2.0-3.0/3.0-6.0	3:1	Loose; cup shaped crystals
143.2-145.1	.8-1.0/.6-.8 occ. 1.2	3:1	Crust from 145.1-145.2
145.1-149.4	1.2-1.4/1.4-1.6	6:1	Slight crust from 149.4-149.5
149.4-152.1	1.0-1.3/.8-1.0 occ. 1.5	3:1	
152.1-155.1	1.3-1.5/1.0-1.3 occ. 1.7	4:1	
155.1-159.6	.8-1.0/1.0-1.2 occ. 1.4	3:1	
159.6-164.1	1.5-1.7/1.3-1.5 occ. 1.0	4:1	
164.1-169.3	3.0-5.0/5.0-8.0	2:1	Cup shaped; loose; zone varies in width
169.3-172.8	.7-1.0/1.0-1.2	3:1	
172.8-178.1	1.0-1.3/.8-1.0 occ. 1.5	2:1	Crust from 178.1-178.2
178.1-189.8	1.2-1.4/1.0-1.2; 1.4-1.6	3:1	
189.8-197.8	1.5-2.0/2.0-2.6	3:1	Fairly loose; cup shaped
197.8-203.2	1.2-1.4/1.4-1.6; 1.0-1.2	4:1	
203.2-204.3			Ice layer with cemented grains
204.3-209.3	1.3-1.5/1.5-1.7 occ. 1.0		
209.3-214.7	1.0-1.3/.8-1.0 occ. 1.5	2:1	
214.7-220.6	.8-1.0/1.0-1.2	3:1	Ice lens from 214.7-214.9 or even 215.5--maybe 10 cms in thickness
220.6-226.7	1.2-1.4/1.0-1.2 occ. 1.5	4:1	
226.7-231.4	2.0-5.0/5.0-7.0	3:1	Loose; cup shaped crystals
231.4-236.2	1.3-1.6/1.0-1.3 occ. 1.8	2:1	
236.2-245.8	1.0-1.3/.8-1.0 occ. 1.5	4:1	Crust at 245.8-245.9
245.8-251.3	.8-1.0/1.0-1.2	2:1	Slight crust at 251.3
251.3-253.3	2.0-4.0/4.0-6.0	3:1	Loose; some cup shaped
253.3-255.1	1.0-1.2/.8-1.0	4:1	Crust at 253.3 and 255.1
255.1-270.7	1.0-1.3/.8-1.0 occ. 1.5	3:1	Crust at 270.7-270.8
270.7-273.5	1.2-1.4/1.0-1.2-1.6	4:1	
273.5-282.6	3.0-6.0/6.0-8.0	2:1	Loose; some cup shaped crystals
282.6-288.3	1.3-1.5/1.0-1.3 occ. 1.7	3:1	
288.3-294.1	1.3-1.5/1.5-1.7 occ. 2.0	4:1	
294.1-300.0+	1.5-1.7/1.3-1.5	3:2	



## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

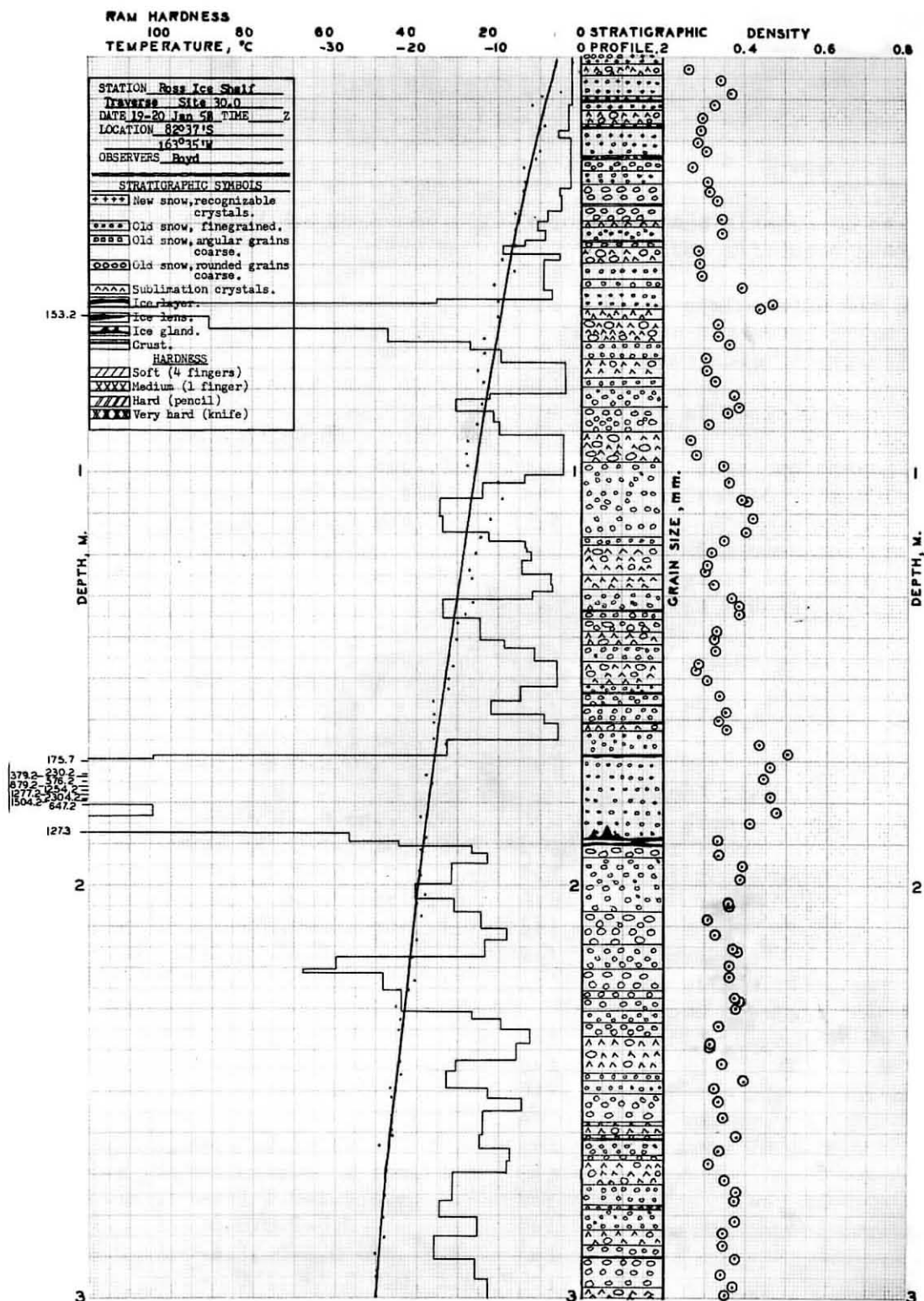
Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 29.2		137.8-147.6	4.7	52.1- 55.0	17.0
January 19, 1958		147.6-148.1	24.2	55.0- 56.7	15.0
0 - 6.2	3.4	148.1-149.5	18.5	56.7- 67.6	4.1
6.2- 8.1	8.5	149.5-151.7	8.7	67.6- 70.2	18.6
8.1- 9.4	7.1	151.7-153.2	17.5	70.2- 72.0	28.2
9.4- 11.3	8.5	153.2-156.7	27.1	72.0- 72.4	28.2
11.3- 15.1	8.5	156.7-159.4	19.0	72.4- 75.1	21.7
15.1- 16.7	9.5	159.4-160.7	19.6	75.1- 79.6	29.9
16.7- 20.5	11.1	160.7-164.0	25.4	79.6- 82.8	22.0
20.5- 22.8	14.1	164.0-166.9	28.3	82.8- 86.0	18.8
22.8- 24.6	6.0	166.9-168.0	67.8	86.0- 90.1	27.6
24.6- 34.0	3.7	168.0-169.0	104.2	90.1- 91.5	10.3
34.0- 35.2	7.4	169.0-174.3	89.2	91.5- 94.1	26.3
35.2- 37.7	13.2	174.3-176.8	64.2	94.1- 99.1	22.2
37.7- 40.5	17.5	176.8-180.3	49.9	99.1-101.1	9.2
40.5- 45.6	18.9	180.3-185.0	42.5	101.1-103.3	8.7
45.6- 49.4	19.0	185.0-190.0	64.2	103.3-104.7	7.8
49.4- 54.7	18.3	190.0-194.1	77.4	104.7-106.0	11.9
54.7- 59.8	18.9	194.1-196.8	104.2	106.0-109.0	24.2
59.8- 61.3	9.9	196.8-197.8	34.2	109.0-112.1	30.0
61.3- 69.5	3.8	197.8-199.7	20.0	112.1-115.2	36.5
69.5- 70.3	22.0	199.7-200.0	5.9	115.2-117.3	47.0
70.3- 74.1	24.3			117.3-119.9	58.0
74.1- 79.2	20.9	Station 29.4		119.9-121.5	60.4
79.2- 82.0	25.4	January 19, 1958		121.5-124.0	68.2
82.0- 84.1	17.5	0 - 5.6	3.4	124.0-127.5	81.3
84.1- 87.4	27.4	5.6- 7.8	5.5	127.5-128.2	47.1
87.4- 90.1	43.9	7.8- 9.8	5.7	128.2-130.5	30.3
90.1- 93.3	43.8	9.8- 12.5	5.1	130.5-133.2	19.0
93.3- 95.2	29.5	12.5- 15.3	5.0	113.2-135.1	9.5
95.2- 97.8	19.6	15.3- 17.4	5.6	135.1-137.4	6.4
97.8- 99.1	11.9	17.4- 22.4	4.2	137.4-138.5	13.3
99.1-101.2	11.3	22.4- 23.1	10.3	138.5-144.2	30.5
101.2-103.1	26.4	23.1- 24.7	22.0	144.2-149.8	23.9
103.1-105.7	15.7	24.7- 28.0	42.6	149.8-155.1	30.6
105.7-107.0	19.6	28.0- 30.5	51.2	155.1-160.1	26.2
107.0-110.0	20.9	30.5- 32.2	38.5	160.1-161.9	20.9
110.0-112.5	16.2	32.2- 33.8	28.2	161.9-164.6	44.9
112.5-112.9	29.2	33.8- 34.9	21.4	164.6-168.3	109.6
112.9-123.3	5.2	34.9- 38.9	18.2	168.3-174.3	97.6
123.3-124.4	26.9	38.9- 42.1	31.3	174.3-176.2	51.6
124.4-129.1	31.9	42.1- 43.1	13.2	176.2-180.5	50.7
129.1-130.6	44.2	43.1- 44.7	9.5	180.5-185.3	35.4
130.6-134.7	38.3	44.7- 45.8	7.7	185.3-188.3	54.2
134.7-135.4	32.8	45.8- 47.5	9.1	188.3-190.9	61.8
135.4-136.7	11.9	47.5- 50.3	6.8	190.0-193.8	24.9
136.7-137.8	8.7	50.3- 52.1	8.8	193.8-195.2	32.8



## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
195.2-196.5	81.2				
196.5-198.5	164.2				
198.5-199.8	235.2				



Ross Ice Shelf Traverse  
 Station Site 30.0  
 Date 19-20 January 1958  
 Observer Boyd

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.4	1.0-1.5/.5-1.0	3:1	New snow altered to hexagonal plates with some needles
0.4- 1.4	.5-.7/.7-1.0	2:1	
1.4- 4.3	1.0-1.3/.8-1.0	3:1	Loose grains with air spaces; some hexagonal prisms; air space absorbs radiation
4.3- 9.2	.3-.5/.5-.7 occ. 1.0	4:1	
9.2- 10.2	.4-.6/.6-.8 occ. 0.2	3:1	Crust at 10.2-10.3
10.2- 12.8	.8-1.0/.6-.8	2:1	
12.8- 16.0	1.2-1.4/1.0-1.2 occ. 1.6	3:1	Loose; some cup shaped
16.0- 16.7	.5-.7/.3-.5 occ. 1.0	4:1	Crust from 16.7-16.8
16.7- 23.6	1.0-1.2/1.2-1.4 occ. 0.8	2:1	
23.6- 24.5	.7-1.0/.5-.7	3:1	Crust with cemented grains; irregular in shape; lens varies widely in depth and form
24.5- 27.1	1.5-1.7/1.3-1.5 occ. 1.0	3:1	Loose grains with air spaces
27.1- 30.2	1.0-1.2/.8-1.0 occ. 0.5	2:1	
30.2- 35.6	1.3-1.5/1.0-1.3	4:1	Crust from 35.6-35.7
35.6- 39.1	1.5-1.7/1.3-1.5 occ. 1.0	2:1	
39.1- 40.8	3.0-6.0/6.0-8.0	2:1	Loose with air spaces; cup shaped crystals
40.8- 44.0	.8-1.0/.6-.8 occ. 1.2	3:1	Crust from 44.0-44.1
44.0- 45.8	1.2-1.4/1.0-1.2 occ. 1.5	4:1	Rather loose
45.8- 49.5	5.0-8.0/8.0-10.0	6:1	Loose; cup shaped crystals
49.5- 53.1	1.0-1.2/.8-1.0 occ. 1.4	3:1	
53.1- 55.2	1.2-1.5/1.0-1.2 occ. 1.7	4:1	
55.2- 60.3	.7-1.0/.5-.7	2:1	Hard packed
60.3- 63.0	5.0-7.0/7.0-10.0	4:1	Loose with air spaces; cup shaped crystals
63.0- 68.2	3.0-5.0/5.0-7.0	2:1	Some cup shaped; loose
68.2- 72.6	1.0-1.3/1.3-1.5; .8-1.0	5:1	
72.6- 77.1	5.0-7.0/7.0-10.0	3:1	Loose; cup shaped; with air spaces
77.1- 78.3	1.0-1.2/1.2-1.4	4:1	Crust from 78.3-78.4
78.3- 84.2	1.2-1.4/1.0-1.2 occ. 1.6	3:1	
84.2- 90.1	1.3-1.5/1.0-1.3 occ. 1.7	2:1	
90.1- 97.3	4.0-6.0/6.0-8.0	2:1	Loose; cup shaped crystals
97.3-115.4	1.0-1.3/.8-1.0 occ. 1.5	4:1	
115.4-117.3	.8-1.0/1.0-1.2 occ. 1.4	3:1	
117.3-124.8	1.3-1.5/1.0-1.3; 1.5-1.7	4:1	Some cup shaped grains
124.8-128.3	3.0-6.0/6.0-8.0	2:1	Loose with air spaces; cup shaped crystals

Ross Ice Shelf Traverse  
Station Site 30.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
128.3-133.3	1.0-1.3/.7-1.0 occ. 1.5	5:1	Crust from 133.3-133.4
133.3-135.6	1.2-1.4/1.0-1.2	2:1	
135.6-138.6	1.3-1.5/1.0-1.3	4:1	
138.6-141.8	2.0-4.0/4.0-7.0 occ. 10.0	3:1	Loose with air spaces; cup shaped crystals
141.8-145.8	1.2-1.4/1.4-1.6	3:1	
145.8-151.2	2.0-4.0/4.0-8.0	2:1	Loose with air space; cup shaped crystals
151.2-153.2	.7-1.0/1.0-1.2	3:1	Crust from 153.2-153.3
153.2-156.5	1.2-1.4/1.4-1.6	2:1	Crust from 156.5-156.6
156.5-160.4	1.3-1.5/1.0-1.3	3:2	Crust from 160.4-160.5
160.4-162.7	2.0-4.0/4.0-6.0 occ. 1.0	2:1	Loose with air space; cup shaped crystals
162.7-168.2	1.0-1.2/.7-1.0	3:1	Ice layer from 168.2-168.4
168.2-188.3	.7-1.0/.5-.7	2:1	Hard packed--shows occasional glands in lower sections
188.3-190.4			Ice layer
190.4-193.2	2.0-4.0/4.0-8.0	3:1	
193.2-206.3	1.3-1.5/1.0-1.3 occ. 1.7	2:1	
206.3-214.3	3.0-5.0/5.0-8.0 occ. 10.0	2:1	
214.3-220.6	1.2-1.4/1.0-1.2 occ. 1.6	3:1	
220.6-225.7	1.3-1.5/1.5-1.7 occ. 1.0	6:1	
225.7-227.3	1.0-1.3/1.3-1.5 occ. 0.8	4:1	
227.3-230.4	1.2-1.4/1.0-1.2 occ. 1.6	3:1	
230.4-233.3	1.0-1.2/.8-1.0 occ. 1.4	4:1	
233.3-236.8	1.3-1.5/1.0-1.3 occ. 1.8	2:1	
236.8-245.3	3.0-6.0/6.0-8.0 occ. 10.0	4:1	Loose with air space; cup shaped crystals
245.3-247.1	1.0-1.3/.8-1.0 occ. 1.5	5:1	
247.1-250.5	1.0-1.2/.8-1.0 occ. 1.4	3:1	
250.5-257.5	1.5-2.0/2.0-4.0	2:1	Loose
257.5-258.2	3.0-5.0/5.0-7.0	3:1	Loose with air spaces; cup shaped crystals
258.2-260.6	5.0-7.0/7.0-9.0	3:1	Crust of cemented grains from 258.2-258.3; loose with air space; cup shaped crystals
260.6-261.3	1.2-1.4/1.0-1.2-1.6	4:1	Crust from 261.3-261.4
261.3-265.1	1.0-1.2/.8-1.0	3:1	
265.1-266.5	1.3-1.5/1.0-1.3	4:1	
266.5-272.2	2.0-4.0/4.0-7.0	3:1	Loose with air space; some cup shaped crystals
272.2-277.7	1.0-1.3/1.3-1.5	5:1	
277.2-278.2	1.0-1.3		Crust of cemented grains
278.2-283.4	1.0-1.3/.8-1.0	4:1	
283.4-287.1	2.0-4.0/4.0-6.0	5:1	Loose; cup shaped crystals

Ross Ice Shelf Traverse  
 Station Site 30.0  
 (Continued)

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Depth cm	Grain Size	Ratio	Remarks
287.1-290.0	1.2-1.4/1.0-1.2	3:1	Slight crust at 290.0
290.0-297.2	1.5-2.0/1.0-1.5	4:1	
297.2-300.0	3.0-5.0/5.0-8.0		Loose; some cup shaped

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

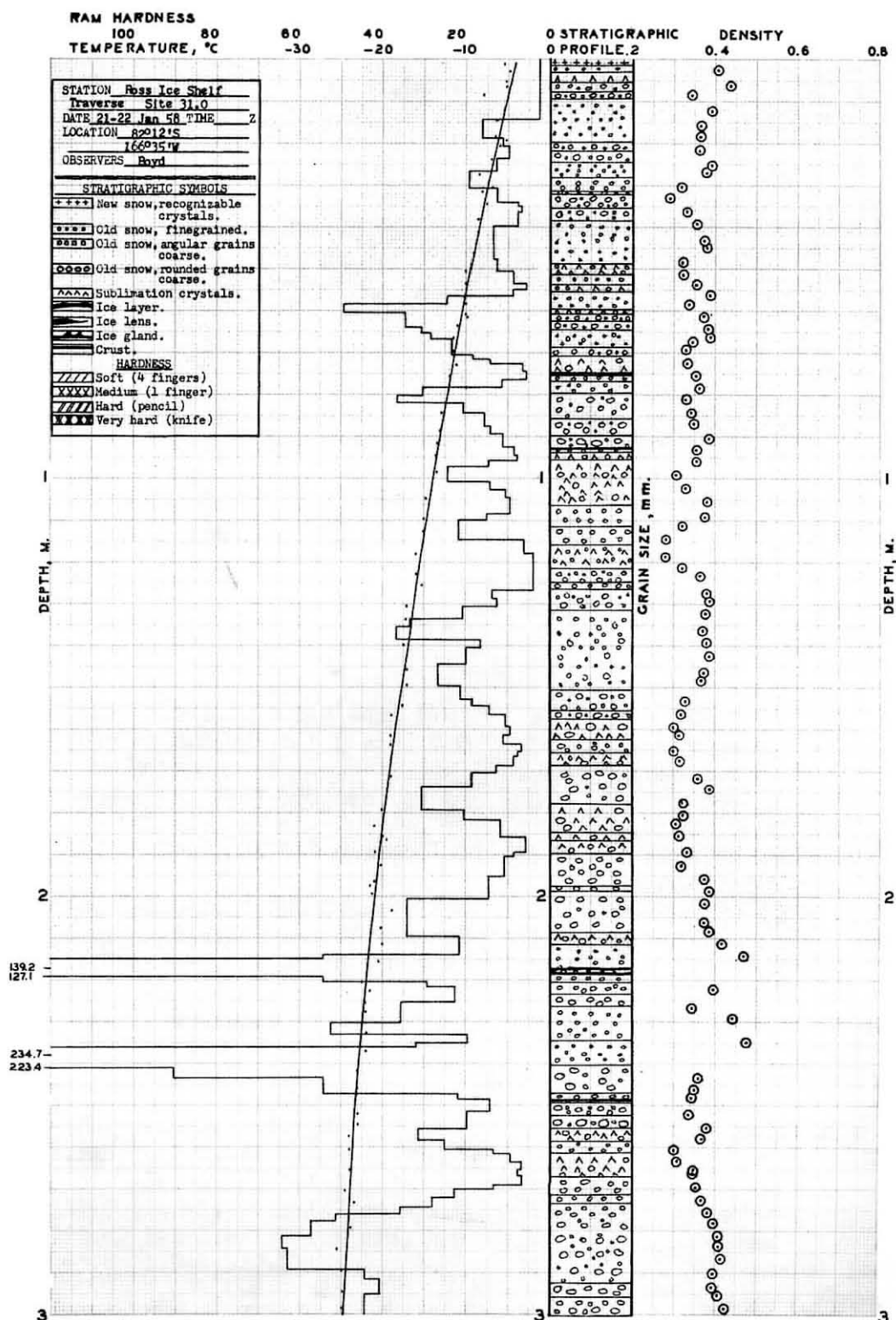
Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 30.2		129.2-132.0	39.9	60.0-61.5	33.2
January 21, 1958		132.0-135.0	64.2	61.5-63.8	110.9
0 - 4.3	3.4	135.0-141.1	82.9	63.8-65.1	41.7
4.3-5.0	17.5	141.1-145.6	26.4	65.1-68.1	46.5
5.0-5.7	31.8	145.6-147.0	25.6	68.1-68.8	31.8
5.7-6.1	9.5	147.0-150.1	30.0	68.8-71.0	7.7
6.1-7.0	69.8	150.1-154.1	34.2	71.0-73.1	5.6
7.0-8.0	28.2	154.1-155.5	18.5	73.1-75.5	11.5
8.0-9.3	22.4	155.5-156.1	20.9	75.5-79.7	13.9
9.3-10.1	15.7	156.1-159.2	15.5	79.7-80.5	15.7
10.1-11.3	11.5	159.2-160.1	9.8	80.5-82.2	12.0
11.3-12.1	9.5	160.1-163.1	5.9	82.2-85.5	9.3
12.1-12.8	10.3	163.1-164.0	15.3	85.5-87.8	7.6
12.8-15.4	5.1	164.0-165.9	17.4	87.8-90.0	7.7
15.4-25.4	3.7	165.9-170.8	16.5	90.0-92.1	11.3
25.4-27.0	9.5	170.8-175.1	27.4	92.1-95.1	14.2
27.0-29.0	13.2	175.1-176.0	15.3	95.1-100.0	24.6
29.0-30.3	18.6	176.0-178.5	26.2	100.0-104.3	22.8
30.3-46.0	3.8	178.5-180.4	46.3	104.3-107.2	7.7
46.0-47.1	7.7	180.4-181.0	70.9	107.2-108.5	23.4
47.1-48.6	6.5	181.0-185.8	62.6	108.5-111.0	52.2
48.6-50.8	7.7	185.8-187.5	21.9	111.0-115.2	66.2
50.8-53.4	7.0	187.5-189.6	18.5	115.2-118.5	58.8
53.4-54.6	7.4	189.6-192.0	20.9	118.5-120.1	35.4
54.6-57.9	4.7	192.0-195.1	26.8	120.1-125.4	33.8
57.9-73.1	3.5	195.1-199.7	30.3	125.4-126.9	17.5
73.1-74.2	12.3	199.7-200.0	37.5	126.9-127.6	11.3
74.2-75.2	18.2			127.6-134.4	4.9
75.2-78.7	23.2			134.4-135.3	15.3
78.7-81.4	18.0	Station 30.4		135.3-138.0	19.0
81.4-83.2	19.9	January 21, 1958		138.0-140.2	13.3
83.2-85.4	16.8	0 - 8.1	3.3	140.2-143.8	13.9
85.4-89.0	14.3	8.1-15.2	3.9	143.8-147.2	27.7
89.0-91.1	17.5	15.2-16.1	8.8	147.2-150.3	42.9
91.1-95.2	23.7	16.1-20.2	11.7	150.3-154.4	43.3
95.2-96.1	9.8	20.2-25.5	13.6	154.4-157.0	46.5
96.1-101.9	5.1	25.5-29.9	16.8	157.0-159.8	39.9
101.9-104.0	25.6	29.9-34.1	15.1	159.8-162.5	26.4
104.0-106.0	39.2	34.1-34.5	15.7	162.5-164.7	17.8
106.0-108.5	56.2	34.5-35.2	10.3	164.7-168.7	15.5
108.5-110.2	63.0	35.2-38.2	9.9	168.7-170.7	9.2
110.2-112.6	54.2	38.2-40.2	13.2	170.7-172.1	14.9
112.6-115.0	45.9	40.2-43.7	17.5	172.1-173.0	37.5
115.0-120.3	38.2	43.7-54.1	4.2	173.0-176.1	59.0
120.3-122.0	21.9	54.1-55.8	6.1	176.1-178.5	54.2
122.0-126.1	26.1	55.8-57.4	9.5	178.5-180.5	19.2
126.1-129.2	33.2	57.4-59.3	5.8	180.5-182.0	27.5
		59.3-60.0	17.5		

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf TraverseObservers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
182.0-184.1	66.1				
184.1-186.0	46.3				
186.0-187.4	25.6				
187.4-189.9	24.2				
189.9-193.4	29.9				
193.4-196.3	21.5				
196.3-199.0	15.3				
199.0-200.0	9.2				





Ross Ice Shelf Traverse  
 Station Site 31.0  
 Date 21 January 1958  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.6	3.0-5.0/5.0-7.0	4:1	New snow altered to hexagonal plates; slight crust at 1.6
1.6- 3.0	.1-.2/.3-.5	5:1	
3.0- 5.4	1.0-2.0/2.0-3.0	4:1	Loose; cup shaped crystals
5.4- 6.8	.8-1.0/.6-.8	2:1	Slight crust at 6.8
6.8- 9.3	1.0-1.2/.8-1.0	3:1	Slight crust at 9.3
9.3- 19.8	.5-.7/.7-1.0	4:1	
19.8- 21.8	1.0-1.2/.8-1.0	3:1	
21.8- 24.2	1.0-1.3/.7-1.0 occ. 1.5	6:1	Crust at 24.2
24.2- 28.0	.5-.7/.7-1.0	4:1	Slight crust at 28.0
28.0- 31.3	1.3-1.5/1.0-1.3	2:1	Crust from 31.3-31.4
31.3- 32.0	1.5-1.7/1.3-1.5 occ. 1.0	3:1	Loose with air space; cup shaped crystals
32.0- 35.2	1.0-1.2/.7-1.0	2:1	
35.2- 38.3	1.2-1.4/1.0-1.2	3:2	
38.3- 48.7	1.0-1.3/.8-1.0 occ. 1.5	2:1	Slight crust at 48.7
48.7- 51.3	1.3-1.5/1.0-1.3 occ. 1.7	4:1	Loose with air space; cup shaped crystals
51.3- 53.7	1.0-1.2/.8-1.0 occ. 1.4	3:1	Crust from 53.7-53.8
53.7- 55.2	2.0-4.0/4.0-6.0 occ. 8.0	2:1	Loose with air space; cup shaped crystals
55.2- 59.8	.5-.7/.7-1.0 occ. .3	4:1	Hard packed individual grains; slight crust at 59.8
59.8- 60.8	3.0-6.0/6.0-8.0 occ. 10.0	4:1	Loose with air space; cup shaped crystals
60.8- 62.3	1.0-1.3/.8-1.0 occ. 1.5	5:1	
62.3- 64.1	1.2-1.4/1.4-1.6; 1.0-1.2	3:1	
64.1- 68.7	.7-1.0/1.0-1.2 occ. .5	3:1	
68.7- 70.8	1.2-1.4/1.4-1.6; 1.0-1.2	4:1	
70.8- 74.8	2.0-4.0/1.0-2.0 occ. 6.0	3:1	Loose with air space; cup shaped crystals
74.8- 75.0	1.0-1.3		Crust of cemented grains from 74.8-75.0
75.0- 76.7	1.0-1.2/.7-1.0	2:1	Slight crust at 76.7
76.7- 79.5	.7-1.0/1.0-1.2	3:1	
79.5- 85.2	1.3-1.5/1.0-1.3	2:1	
85.2- 89.9	1.3-1.5/1.5-1.7 occ. 1.0	2:1	
89.9- 92.8	1.2-1.4/1.0-1.2 occ. 1.6	3:1	
92.8- 93.8	1.0-1.3/0.8	4:1	Crust of cemented grains
93.8- 95.2	2.0/1.5-2.0 occ. 1.0	3:1	Loose; some cup shaped
95.2-106.2	2.0-4.0/4.0-6.0 occ. 8.0	2:1	Loose with air space; cup shaped crystals
106.2-111.1	1.3-1.5/1.0-1.3	2:1	Crust from 106.2-106.3

Ross Ice Shelf Traverse  
 Station Site 31.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
111.1-115.2	1.3-1.5/1.5-1.7 occ. 1.0	3:1	
115.2-121.1	3.0-5.0/5.0-7.0	2:1	Cup shaped; loose with air spaces
121.1-124.8	1.0-1.3/.8-1.0 occ. 1.5	3:1	Very slight crust at 124.8
124.8-126.1	1.0-1.2/1.2-1.4 occ. 1.6	4:1	
126.1-131.2	.8-1.0/1.0-1.2	3:1	
131.2-150.3	.8-1.0/1.0-1.3	2:1	
150.3-155.1	1.2-1.4/1.4-1.6 occ. 1.8	3:1	
155.1-157.5	1.5-1.7/1.3-1.7-2.0	4:1	
157.5-162.2	3.0-5.0/5.0-7.0 occ. 8.0	5:1	Loose with air space; cup shaped crystals
162.2-165.2	1.5-1.7/1.7-2.0; 1.3-1.5	3:1	
165.2-168.7	3.0-5.0/5.0-8.0	2:1	Loose; cup shaped with some air spaces
168.7-177.8	.8-1.0/1.0-1.2	3:1	
177.8-184.7	2.0-4.0/1.0-2.0; 4.0-6.0	3:1	Loose; some cup shaped crystals
184.7-186.5	1.5-2.0/2.0-4.0	5:1	Some cup shaped crystals
186.5-189.7	3.0-5.0/5.0-7.0	4:1	Loose; cup shaped crystals
189.7-197.2	1.3-1.5/1.0-1.3 1.5-1.7	2:1	Crust from 197.2-197.3
197.2-198.7	1.2-1.4/1.0-1.2 occ. 1.6	3:1	
198.7-208.6	1.0-1.3/1.3-1.5	4:1	
208.6-211.2	1.5-2.0/2.0-4.0	3:1	Loose with air space; some cup shaped crystals
211.2-217.2	.7-1.0/.5-.7	2:1	Hard packed; ice layer from 217.2-217.4
217.2-218.7			Ice layer; continuation of small stringer above; varies in width
218.7-220.5	1.0-1.5/1.0-1.3 occ. 1.7	3:1	Well cemented
220.5-223.3	1.7-2.0/1.5-1.8 occ. 1.3	4:1	
223.3-226.2	2.0-2.5/1.7-2.0 occ. 1.5	2:1	
226.2-234.5	1.0-1.2/1.3-1.5	2:1	
234.5-240.3	.7-1.0/.5-.7 occ. 1.2	3:1	Crust in some areas becomes an ice layer of 5 cms thickness; crust from 236.2-236.5
240.3-247.1	1.3-1.5/1.0-1.3 occ. .8	4:1	
247.1-248.5	1.5-1.7/1.3-1.5 occ. 1.0	3:1	
248.5-249.3	1.5-1.7/2.0	6:1	Cemented grains
249.3-252.1	1.5-1.7/1.7-2.0 occ. 1.3	3:1	Crust from 252.1-252.2
252.1-255.1	2.0-2.5/1.8-2.0	2:1	Crust from 255.1-255.2
255.1-258.5	2.0-4.0/4.0-6.0	3:1	Loose with air space; cup shaped crystals
258.5-261.1	1.5-1.7/1.7-2.0 occ. 1.3	4:1	
261.1-267.0	3.0-5.0/5.0-8.0	3:1	Loose with air space; cup shaped crystals

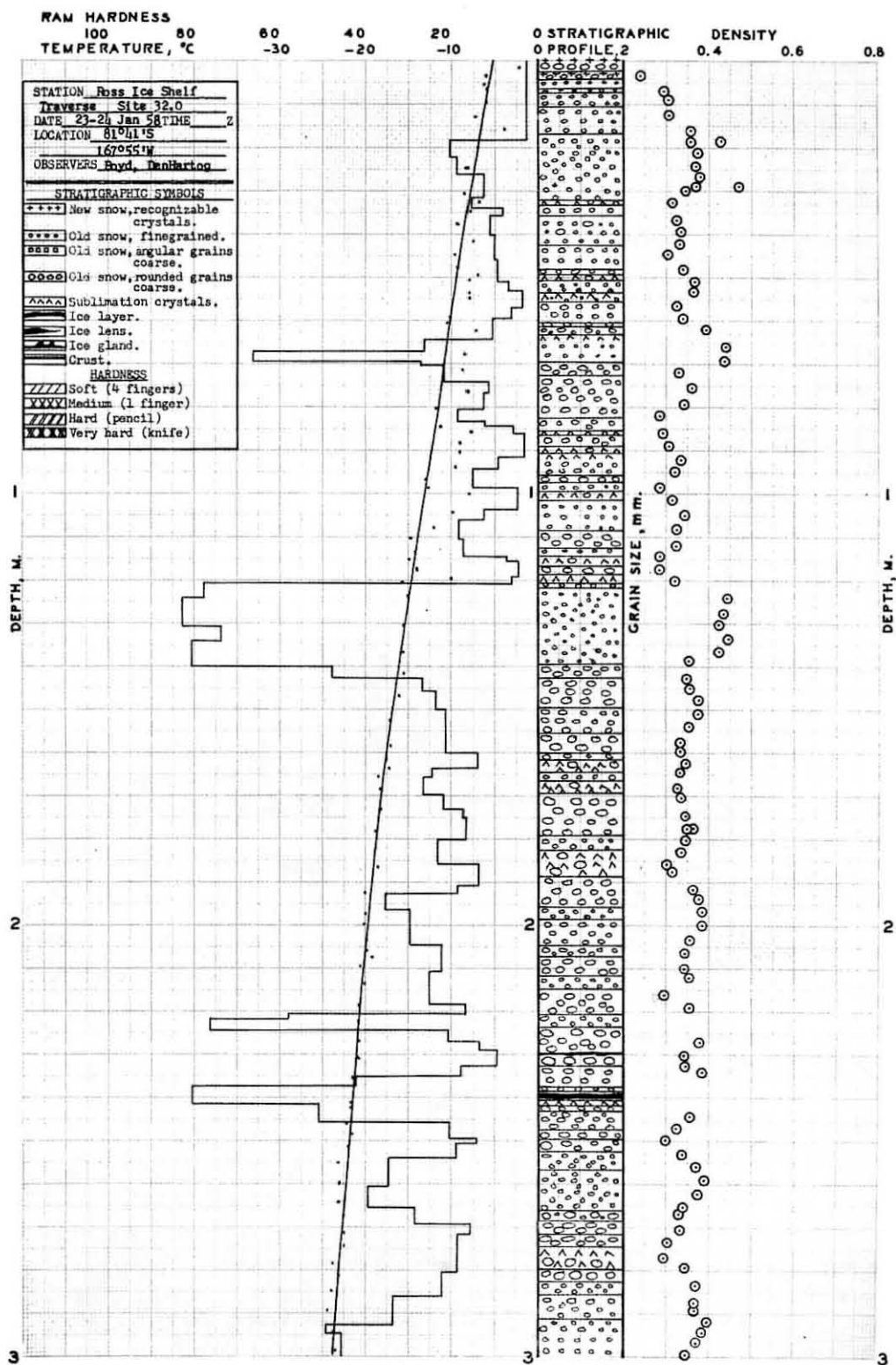
Ross Ice Shelf Traverse  
 Station Site 31.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
267.0-271.3	1.2-1.4/1.0-1.2 occ. 1.6	5:1	
271.3-273.3	1.0-1.3/.8-1.0 occ. 1.5	3:1	Crust from 273.3-273.4
273.3-292.5	1.0-1.3/1.3-1.5 occ. 1.7	5:1	
292.5-295.8	1.7-2.0/1.5-1.7 occ. 1.3	3:1	
295.8-302.0	1.0-1.3/1.3-1.5 occ. 0.8	4:1	
302.0-	2.0-4.0/4.0-7.0 occ. 1.0	5:1	Loose with air space; some cup shaped crystals

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 31.1		148.0=150.2	13.3		
January 23, 1958		150.2=156.9	4.9		
0 = 4.2	3.4	156.9=159.3	14.6		
4.2= 5.2	13.2	159.3=161.4	28.0		
5.2= 7.4	35.0	161.4=163.0	16.7		
7.4= 8.7	34.0	163.0=164.5	10.9		
8.7= 9.3	19.9	164.5=166.0	10.9		
9.3= 10.3	18.2	166.0=167.8	15.3		
10.3= 11.6	10.9	167.8=171.2	18.9		
11.6= 32.9	3.7	171.2=174.3	7.4		
32.9= 34.6	14.5	174.3=175.5	8.4		
34.6= 36.8	14.6	175.5=177.7	31.5		
36.8= 40.2	17.9	177.7=178.6	59.5		
40.2= 41.2	13.2	178.6=180.2	79.2		
41.2= 48.9	16.2	180.2=184.0	72.6		
48.9= 50.1	18.2	184.0=185.4	68.6		
50.1= 51.1	33.2	185.4=189.8	49.7		
51.1= 51.7	19.9	189.8=191.1	19.6		
51.7= 53.0	10.9	191.1=192.1	24.2		
53.0= 65.4	3.6	192.1=194.4	21.6		
65.4= 68.7	9.3	194.4=199.8	33.8		
68.7= 70.6	8.5				
70.6= 73.4	8.6				
73.4= 75.4	5.7				
75.4= 80.1	4.3				
80.1= 82.8	10.6				
82.8= 90.2	28.2				
90.2= 93.1	15.3				
93.1= 94.2	12.3				
94.2= 97.7	19.9				
97.7= 99.9	26.9				
99.9=101.8	14.8				
101.8=102.9	13.3				
102.9=107.2	18.2				
107.2=109.2	27.2				
109.2=111.2	9.2				
111.2=122.7	4.6				
122.7=125.3	13.8				
125.3=128.4	17.1				
128.4=131.2	20.3				
131.2=133.8	19.6				
133.8=136.0	24.7				
136.0=140.3	25.1				
140.3=142.0	21.9				
142.0=146.3	24.0				
146.3=147.4	22.4				
147.4=148.0	20.8				



Ross Ice Shelf Traverse  
 Station Site 32.0  
 Date 23-24 January 1958  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.2			Crust of .5-.7 cms overlain by thin layer of hexagonal plates
0.2- 2.5	2.0-3.5/1.0-2.0	3:1	Hexagonal plates; cupped crystals; some broken prisms; air spaces; loose grains
2.5- 2.8	1.0-1.2/.7-1.0	2:1	Some large crystals; hexagonal plates forms a crust between the two layers
2.8- 4.1	1.5-2.5/1.0-1.5	3:1	Air space; loose hexagonal plates
4.1- 6.1	.3-.5/.1-.3 occ. .7	4:1	Slight crust at 6.1; crust split in two parts at some points
6.1- 7.2	.5-.7/.3-.5 occ. 1.0	3:1	Slight crust at 7.2
7.2- 10.4	1.0-1.2/.8-1.0	3:1	
10.4- 10.7	1.0-1.2/.8-1.0	3:1	Band of smaller grains
10.7- 16.9	1.0/.7-1.0	2:1	Crust from 16.9-17.0
16.9- 32.0	1.0-1.2/.7-1.0	3:2	
32.0- 33.1	1.2-1.4/1.0-1.2	3:1	Some hexagonal plates; loose with air space; cup shaped crystals
33.1- 33.5	1.0-1.2/.8-1.0	2:1	Crust from 33.5-33.6
33.5- 35.4	.8-1.0/1.0-1.2 occ. .6	5:1	
35.4- 42.2	.7-1.0/.5-.7 occ. 1.2	3:1	
42.2- 48.0	1.0-1.2/.7-1.0 occ. .5	4:1	
48.0- 49.2	1.0-1.3/.7-1.0	3:1	
49.2- 50.3	1.5-2.0/1.3-1.5 occ. 1.0	4:1	Some hexagonal plates; loose with air space; cup shaped
50.3- 53.3	.5-.7/.3-.5 Very occ. 1.0	3:1	
53.3- 55.2	1.8-2.5/1.5-1.8	2:1	Loose with air space; cup shaped crystals
55.2- 60.1	1.5-2.0/1.3-1.5	4:1	
60.1- 61.0	2.0/1.5-2.0	2:1	
61.0- 63.2	1.0-1.3/1.3-1.5 occ. 1.8	3:1	
63.2- 63.6	1.3-1.6/1.6-1.8 occ. 2.0	3:1	Loose; few air spaces; cup shaped crystals
63.6- 69.4	.3-.6/.6-.8 occ. 1.0	4:1	Hard packed
69.4- 72.6	1.5-2.0/1.3-1.5 occ. 2.5	3:1	
72.6- 85.2	1.3-1.5/1.5-1.7 occ. 1.0	4:1	
85.2- 86.4	2.0-4.0/4.0-6.0	3:1	Loose with air space; cup shaped crystals



Ross Ice Shelf Traverse  
Station Site 32.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
86.4-89.0	1.5-2.0/1.3-1.5 occ. 2.5	4:1	
89.0-90.1	1.5-2.0/1.3-1.5	3:1	Loose; few cup shaped crystals
90.1-90.7	2.0-3.0/3.0-5.0	2:1	Loose; cup shaped crystals
90.7-95.8	1.0-1.2/1.2-1.4	3:1	
95.8-97.3	1.3-1.5/1.0-1.3 occ. 1.7	2:1	
97.3-99.1	1.0/.8-1.0 occ. 1.2	3:1	
99.1-101.6	3.0-5.0/5.0-8.0	2:1	Loose with air space; cup shaped crystals
101.6-108.3	1.0-1.2/.8-1.0 occ. 1.4	3:1	
108.3-112.6	1.5-1.7/1.3-1.5 occ. 1.0	2:1	
112.6-114.1	1.0-1.2/.8-1.0 occ. 1.5	4:1	
114.1-116.4	3.0-5.0/5.0-7.0 occ. 8.0	6:1	Loose with air space; cup shaped crystals
116.4-118.5	1.3-1.5/1.0-1.3 occ. 1.7	3:1	
118.5-120.3	3.0-5.0/5.0-7.0 occ. 8.0	4:1	Loose with air space; cup shaped crystals
120.3-121.6	1.0-1.2/.7-1.0	3:1	Crust from 121.6-121.7
121.6-139.6	.7-1.0/.5-.7 occ. 1.2	3:1	
139.6-142.5	1.3-1.5/1.0-1.3	2:1	
142.5-149.2	1.5-1.7/1.3-1.5 occ. 2.0	3:1	
149.2-155.3	1.2-1.4/1.4-1.6 occ. 1.0	5:1	
155.3-160.0	1.5-1.7/1.7-2.0; 1.3-1.5	3:1	
160.0-161.5	1.3-1.5/1.0-1.3	2:1	
161.5-164.6	1.5-1.7/1.7-2.0 occ. 2.5	3:1	Loose; some cup shaped
164.6-166.3	1.0-1.2/.7-1.0	2:1	
166.3-169.1	1.5-1.7/1.7-2.5	4:1	Loose; some cup shaped; slight crust at 169.1-169.2
169.1-179.0	1.5-1.7/1.3-1.5 occ. 2.0	3:1	
179.0-182.6	1.0-1.3/1.3-1.5	2:1	
182.6-188.6	2.0-4.0/4.0-6.0	3:1	Loose with air space; cup shaped crystals
188.6-195.8	1.0-1.3/1.3-1.5	4:1	Crust from 195.8-195.9
195.8-198.3	.8-1.0/1.0-1.2	2:1	
198.3-204.8	1.3-1.5/1.0-1.3	3:2	
204.8-207.0	1.0-1.2/1.3-1.5 occ. 1.7	3:1	
207.0-207.5	1.5-1.7/1.3-1.5	2:1	
207.5-211.8	1.3-1.5/1.5-1.7 occ. 2.0	3:1	
211.8-214.8	.7-1.0/1.0-1.2	2:1	
214.8-220.5	1.5-1.7/1.7-2.0 occ. 1.3	4:1	
220.5-223.8	1.3-1.5/1.0-1.3	4:1	Well cemented; ice layer 223.8-224.0
223.8-229.7	1.7-2.0/1.5-1.7 occ. 1.3	3:1	Well cemented; ice layer 229.7-230.0
229.7-232.3	2.0-2.5/1.5-2.0	2:1	
232.3-237.1	1.3-1.5/1.0-1.3	2:1	
237.1-238.3	1.0-1.2/.8-1.0 occ. .6	3:1	Well cemented

Ross Ice Shelf Traverse  
 Station Site 32.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
238.3-240.5			Ice layer; grains cemented; varies in width
240.5-241.8	2.0-4.0/4.0-7.0 occ. 1.0	3:1	Loose; cup shaped crystals
241.8-243.0	1.3-1.5/1.0-1.3 occ. 0.8	2:1	Forms a crust
243.0-247.2	1.0-1.3/1.3-1.5 occ. 1.7	2:1	
247.2-249.8	1.3-1.5/1.0-1.3	3:1	
249.8-252.5	1.5-1.7/1.3-1.5; 1.7-2.0	4:1	
252.5-256.8	1.0-1.2/1.2-1.4 occ. 1.7	6:1	Crust from 256.8-257.0
256.8-266.0	1.0-1.3/.8-1.0 occ. 1.5	3:1	
266.0-268.3	1.5-1.7/1.3-1.5 occ. 1.0	2:1	
268.3-271.4	1.7-2.0/1.5-1.7 occ. 2.5	3:1	
271.4-274.3	2.0-2.5/1.5-2.0 occ. 3.0	2:1	
274.3-279.8	3.0-5.0/5.0-7.0	2:1	Loose with air space; cup shaped crystals
279.8-282.5	1.5-1.7/1.7-2.0 occ. 1.3	3:1	
282.5-285.5	1.0-1.3/.8-1.0	2:1	
285.5-291.0	1.3-1.6/1.0-1.3-1.8	3:1	
291.0-300.0+	1.0-1.2/.7-1.0 occ. 1.4	4:1	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 32.2		139.9-142.3	20.9		
January 25, 1958		142.3-143.6	19.6		
0 - 6.3	3.4	143.6-145.3	16.0		
6.3- 7.9	6.5	145.3-150.9	22.1		
7.9- 11.2	4.7	150.9-156.0	31.6		
11.2- 18.6	3.8	156.0-158.7	33.8		
18.6- 26.4	3.8	158.7-162.0	31.3		
26.4- 27.9	6.8	162.0-165.1	36.4		
27.9- 31.3	4.6	165.1-168.4	40.6		
31.3- 32.1	9.5	168.4-170.0	22.8		
32.1- 35.0	17.0	170.0-171.7	13.0		
35.0- 38.1	25.8	171.7-173.0	8.0		
38.1- 41.6	23.2	173.0-175.6	6.1		
41.6- 43.0	17.5	175.6-176.2	20.9		
43.0- 46.0	13.2	176.2-178.1	35.8		
46.0- 50.6	5.4	178.1-180.0	56.8		
50.6- 52.3	9.1	180.0-182.1	42.3		
52.3- 53.9	9.5	182.1-183.0	15.3		
53.9- 57.8	5.8	183.0-184.4	18.8		
57.8- 58.5	17.5	184.4-185.3	15.4		
58.5- 61.7	18.8	185.3-189.0	17.7		
61.7- 63.4	15.0	189.0-190.9	20.0		
63.4- 66.6	11.0	190.0-194.9	19.2		
66.6- 68.1	9.9	194.9-198.2	22.4		
68.1- 80.1	4.0	198.2-200.0	26.4		
80.1- 81.0	8.8				
81.0- 82.3	10.9				
82.3- 84.8	9.5				
84.8- 91.3	4.0				
91.3- 93.7	7.4				
93.7- 96.6	8.4				
96.6- 97.9	8.0				
97.9-100.0	9.0				
100.0-102.3	15.1				
102.3-105.3	24.2				
105.3-107.2	33.2				
107.2-110.0	47.2				
110.0-113.0	50.9				
113.0-114.7	39.5				
114.7-120.2	26.0				
120.2-124.4	20.9				
124.4-127.0	23.4				
127.0-130.1	46.2				
130.1-134.2	33.5				
134.2-135.6	18.5				
135.6-137.2	16.7				
137.2-139.9	20.9				

## RAM HARDNESS

100 80  
TEMPERATURE, °C60 40 20  
-30 -20 -100 STRATIGRAPHIC  
0 PROFILE, 2DENSITY  
0.4 0.6 0.8

STATION Ross Ice Shelf  
Traverse Site 31.0  
DATE 25-26 Jan 58 TIME 2  
LOCATION 8191015  
16800014  
OBSERVERS Boyd, Den Hartog

STRATIGRAPHIC SYMBOLS

\*\*\* New snow, recognizable crystals.  
Old snow, finegrained.  
Old snow, angular grains coarse.  
Old snow, rounded grains coarse.  
Sublimation crystals.  
Ice layer.  
Ice lens.  
Ice gland.  
Crust.

HARDNESS

Soft (4 fingers)  
Medium (1 finger)  
Hard (pencil)  
Very hard (knife)

DEPTH, M.

2

3

GRAIN SIZE, mm.

DEPTH, M.

2

3

Ross Ice Shelf Traverse  
 Station Site 33.0  
 Date 25-26 January 1958  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0= 0.1			Crust overlying new snow beneath
0.1= 0.8	1.5=2.0/1.0=1.5	3:1	Loose with air spaces; cup shaped; broken prisms and cup shaped crystals
0.8= 2.0	.7=1.0/1.0=1.2	4:1	Occasionally have cup shaped crystals present
2.0= 3.6	.1=.2/.3 occ. .5	5:1	
3.6= 4.1	.5=.7/.3=.5=1.0	3:1	Crust from 3.6=3.7
4.1= 4.7	.8=1.0/.5=.8	2:1	Loose grains with air spaces
4.7= 5.5	.5=.7/.3=.5 occ. 1.0	4:1	Crust at 4.7
5.5= 8.2	.5=.8/.3=.5=1.0	3:1	Slight crust at 8.2
8.2= 13.7	.8=1.0/1.0=1.2 occ. .6	4:1	
13.7= 20.8	1.0=1.3/1.3=1.5 occ. .8	5:1	Crust from 13.7=13.8
20.8= 21.5	.5=.7/1.0	3:1	Crust from 20.8=20.9
21.5= 26.3	1.0=1.2/.8=1.0 occ. 1.4	4:1	
26.3= 33.1	.3=.5/.1=.3 occ. .7	4:1	
33.1= 32.4	.3=.5/.5=.7 occ. 1.0	3:1	
32.4= 38.7	.5=.7/.3=.5 occ. 1.0	4:1	
38.7= 39.8	1.0=1.2/.8=1.0 occ. .6	3:1	Crust from 39.8=40.0
39.8= 40.7	2.0=4.0/4.0=6.0 occ. 1.0	3:1	Cup shaped; loose with air spaces
40.7= 44.4	1.0=1.3/.8=1.0; 1.3=1.5	5:1	Slight crust at 44.4
44.4= 46.5	.8=1.0/1.0=1.2	3:1	
46.5= 49.1	.6=.8/.8=1.0 occ. 1.2	4:1	Crust from 46.5=46.6
49.1= 50.8	1.0=1.2/1.2=1.4 occ. 1.6	5:1	
50.8= 51.6	1.5=2.0/1.3=1.5 occ. 1.0	3:1	
51.6= 53.0	1.3=1.5/1.0=1.3 occ. .7	2:1	Slight crust at 53.0
53.0= 55.8	3.0=5.0/5.0=8.0	4:1	Crust from 55.8=56.0
55.8= 73.2	.8=1.0/.6=.8 occ. 1.2	3:1	
73.2= 74.5	1.0=1.3/.8=1.0	2:1	
74.5= 75.7	.7=1.0/1.0=1.2	3:1	
74.7= 80.3	4.0=6.0/6.0=8.0	2:1	Cup shaped; loose with air spaces
80.3= 83.7	1.0=1.2/1.2=1.4 occ. .8	3:1	
83.7= 85.0	1.0=2.0/2.0=4.0	3:1	Loose with air spaces
85.0= 95.3	1.0=1.3/1.3=1.5	4:1	
95.3= 98.5	3.0=5.0/5.0=7.0	2:1	Loose with air spaces; cup shaped crystals
98.5=100.8	1.3=1.5/1.5=1.7	3:1	Some cup shaped crystals
100.8=105.3	3.0=5.0/5.0=7.0	2:1	Loose with air spaces; cup shaped crystals
105.3=112.2	1.0=1.3/.8=1.0 occ. 1.5	3:1	

Ross Ice Shelf Traverse  
 Station Site 33.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
112.2-116.7	1.5-2.0/1.0-1.3 occ. 2.5	2:1	Broken cup shaped; loose
116.7-117.0	1.5-1.7		Crust of cemented grains
117.0-118.1	1.0-1.2/.7-1.0-1.4	3:1	
118.1-119.5	.5-.8/1.0	2:1	Varies considerably in width and depth
119.5-131.8	1.3-1.5/1.0-1.3 occ. .7	3:2	
131.8-135.3	1.5-1.7/1.7-2.5	3:1	
135.3-139.7	2.0-3.0/3.0-5.0	3:1	
139.7-146.6	.7-1.0/.5-.7	2:1	
146.6-155.8	1.0-1.2/.8-1.0 occ. 1.4	2:1	
155.8-171.2	1.5-2.0/2.0-4.0	4:1	Some cup shaped; loose
171.2-175.1	.8-1.0/1.0-1.2; .6-.8	3:1	
175.1-178.0	3.0-6.0/6.0-8.0	2:1	Cup shaped; loose
178.0-181.8	1.7-2.0/2.0-3.0	3:1	Loose
181.8-185.7	1.3-1.5; 1.0/.8-1.0 occ. 1.7	3:1	
185.7-188.4	1.0-1.3/1.3-1.5 occ. .8	3:1	
188.4-189.6	.8-1.0/1.0-1.2	4:1	Crust from 188.4-188.5
189.6-191.2	.7-1.0/1.0-1.3 occ. 1.5	3:1	
191.2-193.8	.7-1.0/1.0-1.2; .5-.7	2:1	
193.8-195.3	1.3-1.5/1.5-1.7	3:1	
195.3-199.3	3.0-5.0/5.0-7.0	4:1	Loose; cup shaped crystals with air spaces
199.3-200.2	1.5-1.7/1.7-2.0 occ. 2.5	3:1	
200.2-201.5	1.2-1.4/1.0-1.2 occ. 1.6	2:1	
201.5-203.4	1.3-1.5/1.0-1.3 occ. .8	3:2	
203.4-206.2	.8-1.0/1.0-1.2	2:1	
206.2-211.3	1.7-2.0/2.0-2.5 occ. 1.5	5:1	
211.3-220.8	1.2-1.4/1.0-1.2 occ. 1.6	3:1	
220.8-224.3	1.5-1.7/1.2-1.5	2:1	
224.3-229.8	1.0-1.2/.7-1.0	5:1	
229.8-231.3	1.5-2.0/1.0-1.3	3:1	Some cup shaped crystals; slightly cemented
231.3-232.6	2.0-2.5/1.5-2.0	4:1	Loose
232.6-234.3	2.5-3.0/2.0-2.5 occ. 1.0	3:1	Occasionally grains cup shaped; affected by exposure of wall
234.3-234.6			Crust and ice layer
234.6-238.1	.6-.8/.8-1.0	3:1	Slightly cemented
238.1-240.8	1.3-1.5/1.0-1.3	2:1	Slightly cemented
240.8-248.0	1.0-1.3/1.3-1.5	4:1	
248.0-249.5	1.3-1.5		Ice layer with grain bands interspersed
249.5-252.2	1.5-1.7/1.3-1.5 occ. 2.0	3:1	
252.2-256.1	1.0-1.2/.8-1.0 occ. 1.5	2:1	
256.1-257.2	2.0-4.0/4.0-5.0	3:1	

Ross Ice Shelf Traverse  
 Station Site 33.0  
 (Continued)

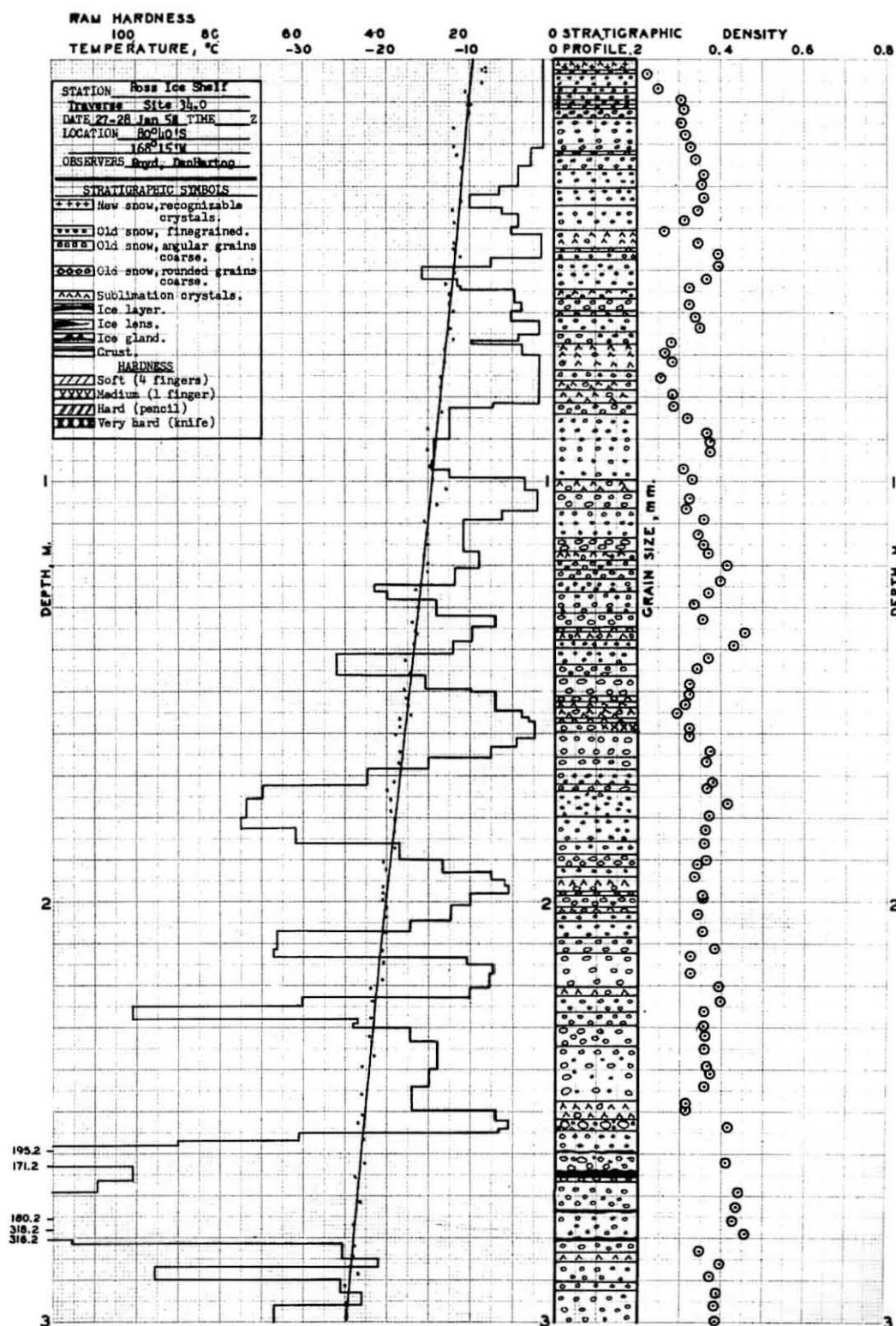
Depth cm	Grain Size	Ratio	Remarks
257.2-260.1	1.0-1.2/1.2-1.5 occ. .8	6:1	
260.1-263.9	1.0-1.3/.8-1.0 occ. 1.5	3:1	
263.9-267.7	.8-1.0/1.0-1.2	2:1	
267.7-269.1	1.3-1.5/1.0-1.3 occ. .7	4:1	
269.1-270.4	2.0-4.0/4.0-6.0	3:1	Loose with air spaces; some cup shaped crystals
270.4-272.2	1.0-1.2/.8-1.0 occ. 1.4	3:1	Crust from 270.4-270.7; may become ice layer
272.2-273.7	1.5-2.0/1.3-1.5	2:1	Some cup shaped crystals
273.7-274.6	1.0-1.2/.7-1.0	2:1	
274.6-277.5	1.0-1.3/.8-1.0	3:1	
277.5-278.2	1.0-2.0/2.0-4.0	3:1	Loose; some cup shaped
278.2-281.0	1.5-1.7/1.3-1.5	2:1	
281.0-281.7	3.0-5.0/5.0-7.0	4:1	Cup shaped crystals
281.7-282.6	1.3-1.5/1.5-1.7	3:1	
282.6-285.3	1.0-1.2/.7-1.0	2:1	Cemented
285.3-294.4	1.0-1.3/.8-1.0 occ. 1.5	3:1	
294.4-296.3	1.3-1.5/1.5-1.7 occ. 1.0	6:1	
296.3-298.2	1.3-1.5/1.0-1.3	2:1	
298.2-300.0+	1.5-1.7/1.3-1.5	4:1	



## RAM HARDNESS DATA SHEET

 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 33.2		133.5-138.4	15.4		
January 27, 1958		138.4-140.1	24.8		
0 - 8.6	3.3	140.1-143.7	37.6		
8.6- 10.3	12.1	143.7-149.0	36.3		
10.3- 30.5	3.4	149.0-151.2	45.1		
30.5- 30.7	28.2	151.2-152.0	85.4		
30.7- 32.0	18.6	152.0-155.1	62.2		
32.0- 34.1	17.5	155.1-157.8	26.4		
34.1- 34.8	17.5	157.8-159.3	17.5		
34.8- 41.3	4.0	159.3-160.5	16.7		
41.3- 42.3	13.2	160.5-161.5	9.2		
42.3- 45.3	13.2	161.5-163.3	15.3		
45.3- 49.5	15.1	163.3-164.3	24.2		
49.5- 51.6	19.9	164.3-167.8	29.8		
51.6- 54.1	11.2	167.8-170.4	42.7		
54.1- 55.9	8.8	170.4-174.0	59.8		
55.9- 57.2	14.7	174.0-177.1	82.7		
57.2- 59.8	5.1	177.1-178.9	37.5		
59.8- 67.4	3.9	178.9-180.8	25.2		
67.4- 69.1	9.1	180.8-184.6	30.5		
69.1- 70.7	12.6	184.6-188.3	31.2		
70.7- 73.7	13.2	188.3-191.1	25.6		
73.7- 74.9	7.4	191.1-195.5	27.0		
74.9- 76.3	10.3	195.5-198.3	14.9		
76.3- 78.2	11.1	198.3-199.8	10.9		
78.2- 78.9	10.4				
78.9- 80.6	17.9				
80.6- 81.0	40.8				
81.0- 83.3	42.3				
83.3- 84.2	37.6				
84.2- 85.0	23.0				
85.0- 86.4	18.5				
86.4- 90.0	15.3				
90.0- 91.1	8.8				
91.1- 93.1	6.7				
93.1- 94.2	13.3				
94.2- 96.1	20.0				
96.1- 98.7	8.1				
98.7-109.1	5.1				
109.1-110.2	13.3				
110.2-112.1	14.7				
112.1-115.1	15.9				
115.1-123.9	17.3				
123.9-126.0	20.8				
126.0-129.1	33.2				
129.1-131.2	32.8				
131.2-133.5	31.6				



Ross Ice Shelf Traverse  
 Station Site 34.0  
 Date 27 January 1958  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.1			Crust of hexagonal plates
0.1- 2.3	1.0-1.2/.8-1.0	2:1	Loose; cup shaped; some hexagonal plates
2.3- 2.7	.6-.8/.3-.6 occ. 1.0	2:1	Crust formations
2.7- 3.1	1.3-1.5/1.0-1.3 occ. 1.7	3:1	Loose with air space
3.1- 3.5	.3-.5/.5-.7	4:1	Crust formation
3.5- 6.3	.2-.4/.4-.6-.1	3:1	
6.3- 6.9	.1-.3		Crust formation
6.9- 7.8	1.0-1.2/.8-1.0 occ. 1.4	3:1	Loose with air space
7.8- 9.1	.1-.3/.3-.5	4:1	
9.1- 9.7	.8-1.0/1.0-1.2	3:1	Crust from 9.7-9.8; loose; air space
9.7- 10.3	.3-.5/.5-.7	2:1	
10.3- 11.7	.5-.7/.3-.5 occ. 1.0	3:1	
11.7- 13.2	1.0-1.2/.8-1.0	3:1	Slight crust at 13.2
13.2- 13.9	.7-1.0/1.0-1.2	3:2	Slight crust at 13.9
13.9- 21.8	.7-1.0/.5-.7; 1.0-1.2		
21.8- 22.3	1.0-1.2/.8-1.0	3:1	
22.3- 26.0	.7-1.0/.5-.7 occ. .3	2:1	
26.0- 30.2	.6-.8/.8-1.0	3:1	Crust from 30.2-30.3
30.2- 34.5	1.0-1.2/.7-1.0	2:1	
34.5- 40.2	1.0/.7-1.0 occ. .5-.7	3:1	
40.2- 44.8	1.0-2.0, 2.0-4.0/.8-1.0	3:1	Layer shows frequent small crusts; loose with air space; cup shaped; lesser amounts of 1.0-2.0
44.8- 45.3	1.5-2.0/1.0-1.5 occ. .3	4:1	Some cup shaped crystals
45.3- 47.1	.7-1.0/1.0-1.3	3:1	Crust from 47.1-47.2
47.1- 54.2	.5-.7/.7-1.0; 1.0-1.2	3:1	Lesser amounts of 1.0-1.2
54.2- 56.6	1.3-1.5/1.0-1.3 occ. 1.7	4:1	Loose; some cup shaped
56.6- 59.3	1.3-1.5/1.5-1.7; 1.0-1.3	3:1	
59.3- 60.7	3.0-5.0/5.0-7.0 occ. 10.0	4:1	Loose with air space; cup shaped crystals
60.7- 64.3	.5-.7/.7-1.0; 1.0-1.3 occ. 1.5	3:1	Lesser amounts .7-1.0
64.3- 67.2	1.3-1.5/1.5-1.7 occ. 1.0	3:1	
67.2- 73.5	5.0-8.0/8.0-10.0; 3.0-5.0	4:1	Loose with air space; cup shaped crystals
73.5- 76.0	1.0-1.3/1.3-1.5; .7-1.0	3:1	
76.0- 78.1	2.0-4.0/4.0-7.0	4:1	Loose; air spaces; cup shaped crystals
78.1- 81.2	3.0-5.0/1.0-3.0	3:1	Loose; cup shaped crystals
81.2- 84.0	1.3-1.5/1.0-1.3 occ. 1.7	4:1	

Ross Ice Shelf Traverse  
 Station Site 34.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
84.0-99.4	1.0-1.2/1.2-1.4 occ. .8	3:1	
99.4-102.3	3.0-5.0/5.0-8.0	2:1	Loose with air spaces; cup shaped
102.3-106.2	1.3-1.5/1.5-1.7; 1.0-1.3	4:1	
106.2-113.3	1.0-1.2/.7-1.0 occ. 1.4	5:1	Exposed wall
113.3-116.8	1.3-1.5/1.5-1.7	4:1	
	occ. 1.0-1.3		
116.8-118.7	1.5-1.7/1.7-2.0 occ. 1.3	3:1	Loose; some cup shaped crystals
118.7-121.0	1.0-1.3/.7-1.0	2:1	
121.0-123.1	1.3-1.5/1.0-1.3	3:1	
123.1-126.3	.7-1.0/.5-.7	2:1	
126.3-131.2	1.0-1.3/.7 occ.	4:1	
131.2-134.7	1.3-1.5/1.0-1.3	2:1	
134.7-135.7	1.0-1.3/.8-1.0	2:1	
135.7-136.8	1.5-1.7/1.7-2.5	3:1	Loose with air space; some cup shaped crystals
136.8-139.5	.3-.5/.5-.7 Very occ. 1.0	4:1	
139.5-143.2	1.0-1.2/.7-1.0	3:1	
143.2-146.1	1.0-1.3/1.3-1.5	2:1	Slight crust at 146.1
146.1-151.0	1.5-1.7/1.7-2.0	4:1	
	occ. 1.3-1.5		
151.0-152.6	1.0-1.3/1.5	5:1	Crust formation
152.6-153.8	3.0-5.0/1.0-3.0	2:1	Loose with air spaces; cup shaped crystals
153.8-156.3	3.0-5.0/5.0-7.0	3:1	Cup shaped; loose
156.3-157.3	2.0-4.0/1.0-2.0	3:1	Loose; cup shaped crystals
157.3-157.6	1.3-1.5		Crust formation--cemented grains
157.6-159.4	1.0-1.3/1.3-1.5 occ. 1.7	2:1	
159.4-165.6	1.3-1.5/1.0-1.3	2:1	
	.8-1.0	4:1	
165.6-168.2	1.0-1.2/1.2-1.4 Rare 1.6	3:1	
168.2-172.1	.7-1.0/1.0-1.2	3:1	
	.5-.7	2:1	
172.1-173.7	1.0-1.3-.8/1.3-1.5	3:1	
	occ. 1.7		
173.7-179.8	.6-.8/.8-1.0	4:1	
179.8-185.8	1.2-1.4/1.4-1.6	5:1	
	1.0-1.2	2:1	
185.8-188.7	1.0-1.2/1.2-1.4	3:1	
188.7-191.8	1.0-1.3/1.3-1.5	2:1	
191.8-194.0	.8-1.0/1.0-1.2	3:1	
194.0-197.3	2.0-4.0/4.0-6.0	2:1	Cup shaped; loose
	1.3-1.5/1.5-1.7	3:1	Smaller grains not cup shaped

Ross Ice Shelf Traverse  
 Station Site 34.0  
 (Continued)

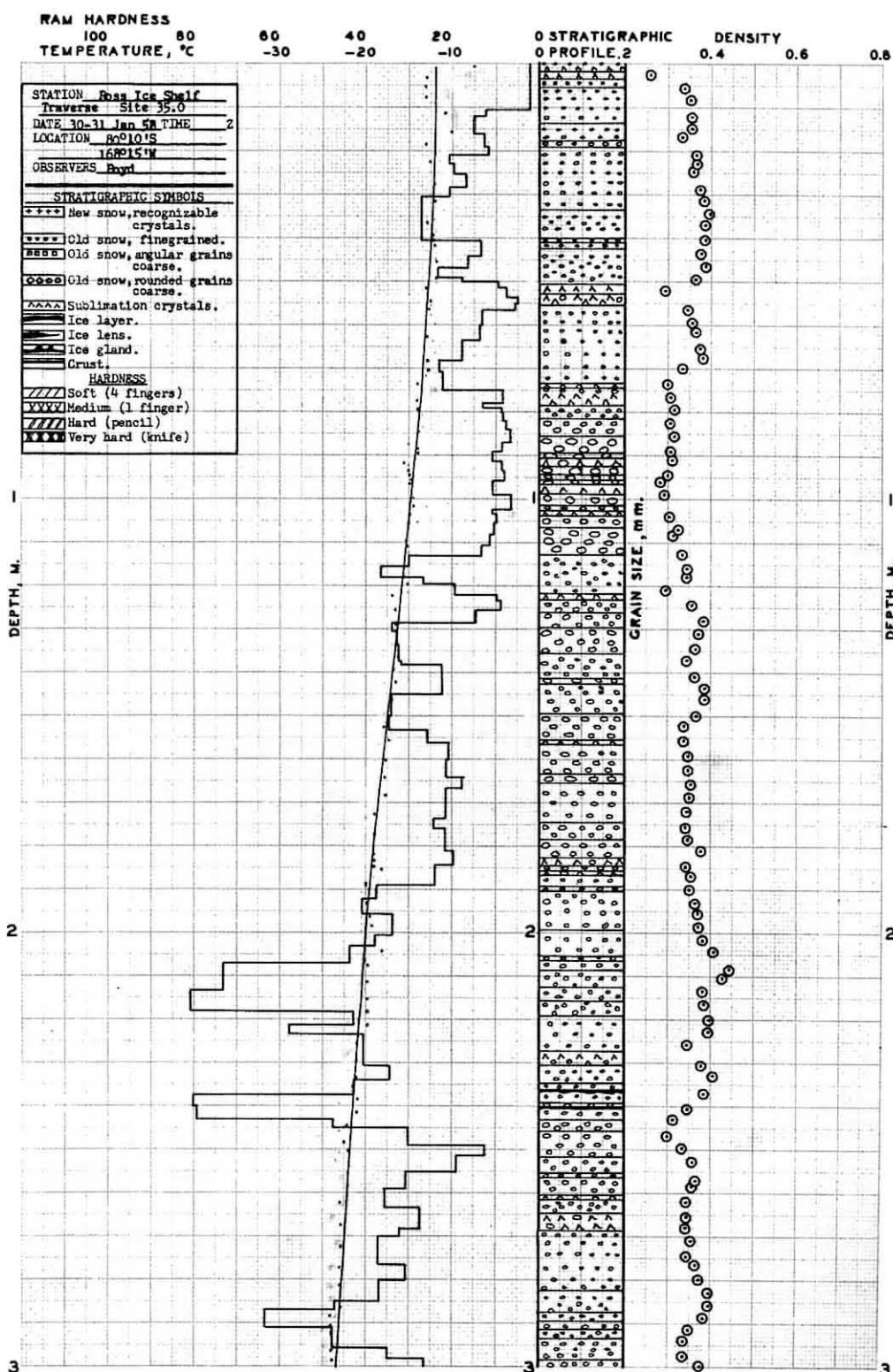
Depth cm	Grain Size	Ratio	Remarks
197.3-198.2	1.0-1.3/1.3-1.5 occ. 1.7	2:1	
198.2-198.8	1.3-1.5/1.7-1.0	5:1	Crust formation
198.8-201.3	1.0-1.3/1.3-1.6	4:1	
201.3-202.4	3.0-5.0/1.0-3.0	2:1	Loose; some cup shaped crystals
202.4-204.7	1.0-1.3/.8-1.0 occ. 1.5	3:1	Crust from 204.7-204.8
204.7-208.3	1.3-1.5/1.5-1.7	4:1	
	1.0-1.3	3:2	Crust from 208.3-208.4
208.3-212.2	.7-1.0/1.0-1.2	3:1	
212.2-220.2	1.3-1.5/1.5-1.7 occ. 2.0	3:1	Exposed wall
220.2-222.3	2.0-4.0/4.0-6.0	2:1	Loose; some cup shaped crystals
222.3-226.1	.7-1.0/.5-.7	3:1	Hard packed
226.1-229.3	1.3-1.5/1.5-1.7 occ. 2.0	4:1	
229.3-234.2	1.3-1.5/1.5-1.7 occ. 2.0	3:1	
234.2-247.3	1.0-1.3/1.3-1.5 occ. 1.7	2:1	
247.3-251.8	1.5-1.7/1.3-1.5; 1.7-2.0	3:1	Some cup shaped grains
251.8-254.2	3.0-5.0/1.0-3.0	2:1	Some cup shaped; cemented
254.2-264.6	1.0-1.3	2:1	Grain size to 259; ice layer 254.2-254.4
	1.5-2.0/1.3-1.5	3:1	Grain size from 259.0-264.0 ice layer 259.3-259.6
264.6-265.2			Ice layer varying in width contains ice gland
265.2-266.5	1.5-1.7/1.7-2.0	3:1	Ice layer 265.5-265.7; con- tains ice gland
266.5-273.2	1.0-1.2/.8-1.0 occ. 1.4	2:1	Contains ice gland
273.2-280.3	.8-1.0/.6-.8	3:1	Ice layer from 273.2-273.4; contains ice gland
280.3-283.3	1.5-1.7/1.3-1.5	2:1	Ice layer from 280.3-280.4; contains ice gland
283.3-285.5	5.0-8.0/1.3-1.5		Loose; cup shaped crystals
285.5-290.1	1.0-1.2/.7-1.0	3:1	
290.1-292.3	1.0-1.3/.8-1.0	2:1	
292.3-300.0+	1.0-1.3/1.3-1.5	4:1	
	.8-1.0	3:1	

## RAM HARDNESS DATA SHEET

 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 34.2		115.4-118.6	22.9		
January 30, 1958		118.6-120.7	18.5		
0 - 8.9	3.3	120.7-121.7	14.2		
8.9- 10.3	13.9	121.7-125.3	26.4		
10.3- 19.1	3.7	125.3-127.8	20.2		
19.1- 20.2	7.7	127.8-130.1	16.7		
20.2- 21.4	7.4	130.1-135.4	23.1		
21.4- 31.6	3.7	135.4-138.8	24.8		
31.6- 32.3	10.4	138.8-140.5	16.0		
32.3- 34.3	13.2	140.5-144.9	20.1		
34.3- 36.1	17.1	144.9-148.2	34.5		
36.1- 37.7	21.9	148.2-150.1	51.6		
37.7- 39.0	34.0	150.1-152.0	51.6		
39.0- 40.3	34.0	152.0-154.9	35.2		
40.3- 43.8	23.2	154.9-158.4	32.8		
43.8- 46.6	6.8	158.4-162.5	33.5		
46.6- 48.2	6.1	162.5-167.0	37.6		
48.2- 52.0	4.5	167.0-170.2	35.4		
52.0- 53.4	10.3	170.2-172.0	32.0		
53.4- 55.4	18.2	172.0-175.3	28.4		
55.4- 59.1	27.6	175.3-177.0	21.8		
59.1- 61.3	26.0	177.0-179.4	16.7		
61.3- 63.0	26.8	179.4-180.3	15.3		
63.0- 65.3	25.0	180.3-183.0	13.5		
65.3- 67.1	25.4	183.0-184.9	9.5		
67.1- 70.5	29.6	184.9-186.2	8.0		
70.5- 74.2	27.6	186.2-187.9	33.6		
74.2- 77.5	15.3	187.9-189.7	9.8		
77.5- 80.3	15.7	189.7-191.2	10.9		
80.3- 82.4	10.4	191.2-193.0	32.0		
82.4- 83.3	8.8	193.0-194.8	48.7		
83.3- 85.1	8.8	194.8-196.1	42.6		
85.1- 87.2	12.7	196.1-198.6	44.2		
87.2- 89.7	5.2	198.6-200.0	32.8		
89.7- 90.7	8.2				
90.7- 92.6	5.8				
92.6- 93.7	7.7				
93.7- 95.2	9.9				
95.2- 96.4	11.5				
96.4- 97.8	14.9				
97.8-101.3	6.2				
101.3-102.1	10.5				
102.1-105.2	15.5				
105.2-108.8	18.1				
108.8-109.9	13.3				
109.9-111.4	14.2				
111.4-115.4	21.7				







Ross Ice Shelf Traverse

Station	Site 35.0
Date	30-31 January 1958
Observer	Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.1	.1-.3		Crust of fine snow
0.1- 1.9	1.5-2.0/3.0-5.0	6:1	Crust from 1.9-2.0; crust may widen to 1.5 cms; loose; cup shaped crystals
1.9- 3.4	1.0-1.5/1.5-3.0	3:1	Loose with air space; cup shaped crystals
3.4- 5.7	.3-.5/.5-.7 occ. 1.0	3:1	
5.7- 13.7	.5-.7/.7-1.0; .3-.5	2:1	
13.7- 17.8	.7-1.0/.5-.7; 1.0-1.2	4:1	
17.8- 19.1	1.0-1.2/.7-1.0	3:1	Crust from 19.1-19.2
19.1- 33.7	.8-1.0/1.0-1.2	2:1	Slight crust 33.7
33.7- 40.0	.5-.7/.3-.5 occ. 1.0	3:1	
40.0- 40.7	.5-.7/.7-1.0	4:1	
40.7- 42.3	.6-.8/.3-.6	3:1	
42.3- 50.7	.8-1.0/.6-.8	4:1	
50.7- 52.8	1.0-2.0/2.0-4.0 occ. 6.0	3:1	Loose with air spaces; cup shaped crystals
52.8- 55.2	1.5-2.0/2.0-2.5	4:1	Some cup shaped crystals; crust from 55.2-55.3
55.2- 73.2	.8-1.0/1.0-1.2	3:1	
73.2- 74.3	3.0-5.0/1.0-3.0	2:1	Loose; poorly formed cup shaped crystals
74.3- 74.5	.7-1.0/1.0-1.2	5:1	
74.5- 78.2	2.0-4.0/4.0-6.0	3:1	Loose; cup shaped crystals
78.2- 81.5	1.0-1.3/.8-1.0	2:1	
81.5- 85.5	1.3-1.5/1.5-1.7; 1.0-1.3	4:1	
85.5- 89.4	1.5-1.7/1.3-1.5	2:1	
89.4- 90.6	1.7-2.0/1.5-1.7	2:1	
90.6- 92.4	3.0-5.0/1.0-3.0	2:1	Loose; cup shaped crystals
92.4- 94.2	2.0-4.0/4.0-6.0	3:1	Loose
94.2- 95.3	1.5-3.0		Crust formation
95.3- 96.4	1.5-2.0/2.0-4.0	3:1	Loose; air space
96.4- 98.9	1.3-1.6/2.0-4.0	3:1	Loose; cup shaped crystals
98.9-101.2	1.5-1.8/1.8-2.5	4:1	Loose with air space
101.2-102.6	1.0-1.2/1.2-1.4; .7-1.0	4:1	
102.6-103.8	3.0-5.0/1.0-2.0	2:1	Loose; some cup shaped
103.8-106.2	1.3-1.5/1.5-1.7	4:1	
106.2-112.8	1.5-1.7/1.7-2.0	3:1	
112.8-121.8	.7-1.0/.5-.7 occ. 1.2	5:1	Crust from 112.8-113.0
121.8-123.0	2.0-4.0/1.0-2.0	3:1	Loose with air spaces; cup shaped crystals
123.0-126.0	1.0-1.3/.7-1.0	4:1	Crust from 126.0-126.1
126.0-129.6	1.0-1.2/1.2-1.4	3:1	
129.6-135.8	1.3-1.5/1.0-1.3	4:1	
135.8-141.2	1.0-1.2/.8-1.0	2:1	

Ross Ice Shelf Traverse  
 Station Site 35.0  
 (Continued)

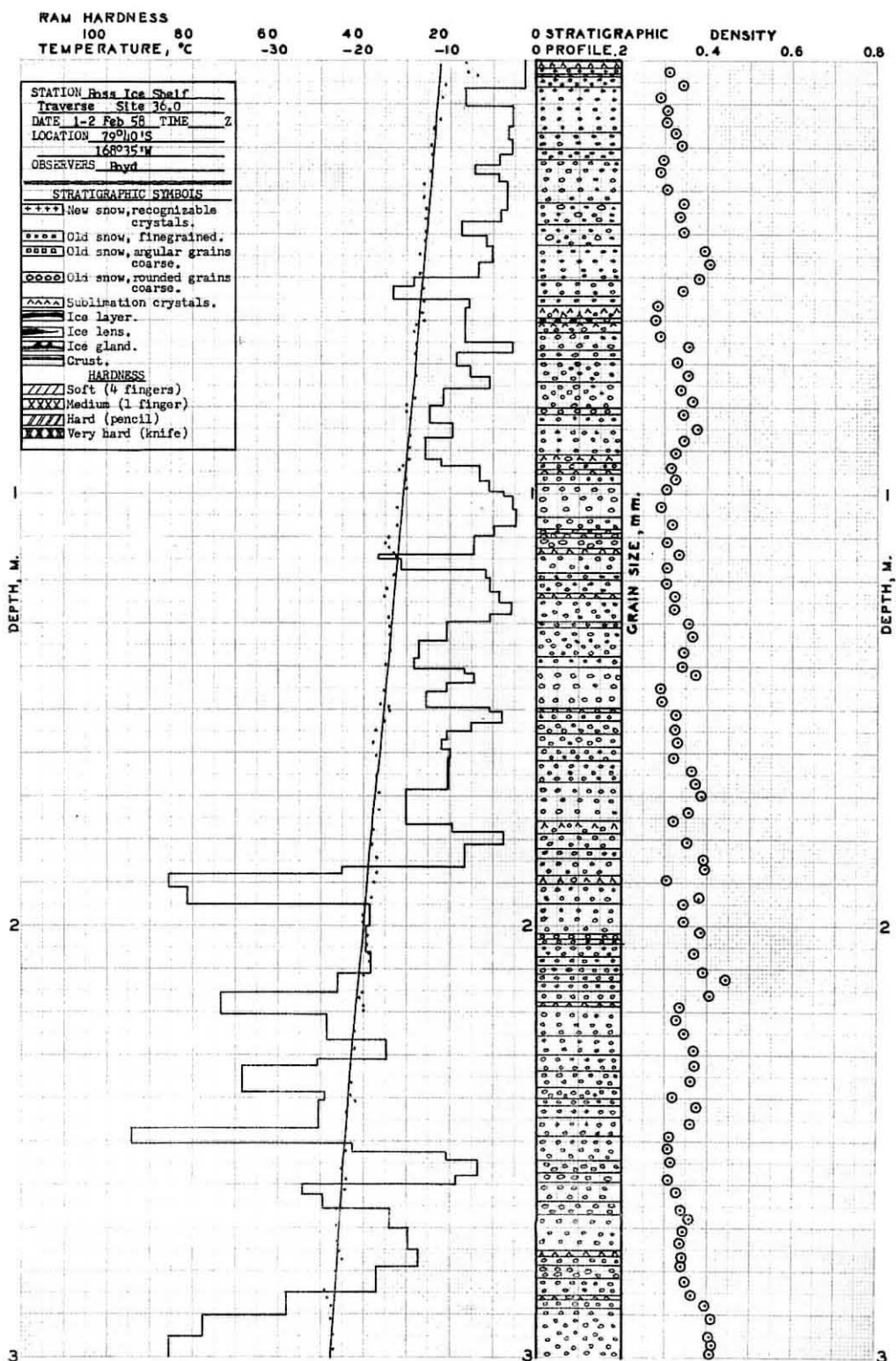
Depth cm	Grain Size	Ratio	Remarks
141.2-142.6	1.3-1.5/1.0-1.3	2:1	
142.6-149.5	1.0-1.2/.8-1.0	3:1	
149.5-155.4	1.5-1.7/1.3-1.5 occ. 1.0	2:1	
155.4-156.5	3.0-5.0/5.0-7.0	3:1	Loose with air spaces; cup shaped; crust from 156.5-156.6
156.5-163.1	1.5-1.7/1.3-1.5	2:1	
163.1-165.3	1.5-1.7/1.7-2.0 occ. 1.3	3:1	
165.3-174.7	1.0-1.3/1.3-1.5	2:1	
174.7-178.3	1.3-1.5/1.5-1.7 occ. 1.0	4:1	Crust from 174.7-174.8
178.3-182.5	1.7-2.0/1.5-1.7	2:1	
182.5-184.3	2.0-4.0/1.5-2.0	3:1	Loose; some cup shaped crystals
184.3-185.4	1.3-1.5/1.0-1.3	2:1	Crust formation
185.4-186.5	2.0-4.0/4.0-6.0	3:1	Loose with air spaces; cup shaped
186.5-189.2	.8-1.0/1.0-1.2	3:1	
189.2-190.1	1.0-1.2/.8-1.0	2:1	
190.1-199.3	1.0-1.3/.8-1.0	2:1	
	occ. 1.3-1.5	3:1	
199.3-205.2	1.0-1.2/.7-1.0	2:1	
205.2-206.3	.7-1.0		
206.3-208.5	1.0-1.3/.8-1.0	2:1	
208.5-212.6	.7-1.0/.5-.7	4:1	
212.6-215.8	1.0-1.3/1.3-1.5	5:1	
215.8-219.0	1.3-1.5/1.0-1.3	2:1	
219.0-227.2	1.0-1.3/.8-1.0	4:1	
227.2-230.3	2.0-4.0/1.0-2.0	4:1	Loose; some cup shaped
230.3-234.8	.8-1.0/1.0-1.2	3:1	
234.8-236.2	1.0/1.0-1.2 Some .8-1.0	4:1	Ice layer from 236.2-236.4
236.2-239.1	.7-1.0/.5-1.7 occ. 1.2	3:1	Shows a few ice glands; crust or ice layer 239.1-239.3
239.1-240.0	1.3-1.5/1.5-1.7	4:1	Ice layer 240.0-240.2; slightly cemented
240.0-243.0	1.0-1.3/1.3-1.5	3:1	
243.0-245.6	1.5-1.7/1.7-2.0	2:1	Crust from 245.6-245.8
245.6-251.8	1.3-1.5/1.5-1.7	3:1	Crust from 251.8-251.9
251.8-255.1	1.0-1.3/1.3-1.5	4:1	
255.1-256.2	.7-1.0/1.0-1.2	4:1	Crust formation
256.2-260.3	1.3-1.5/1.0-1.3	2:1	
260.3-261.2	2.0-4.0/4.0-6.0	3:1	Loose with air space; some cup shaped
261.2-264.3	1.0-1.2/.8-1.0	3:1	
264.3-268.7	1.5-1.7/1.7-2.5	3:1	Crust from 268.7-268.9; poor cup shaped

Depth cm	Grain Size	Ratio	Remarks
268.7-282.1	.8-1.0/1.0-1.2	2:1	
282.1-287.5	.7-1.0/1.0-1.3	4:1	
287.5-289.6	1.0-1.3/1.3-1.5	4:1	
289.6-291.3	1.3-1.5/1.0-1.3	3:1	
291.3-293.4	.7-1.0/.5-.7	5:1	
293.4-298.3	1.3-1.5/1.0-1.3	3:1	
298.3-300.04	1.5-1.7/1.3-1.5	2:1	

## RAM HARDNESS DATA SHEET

 Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
<b>Station 35.2</b>					
February 1-2, 1958					
0 - 8.2	3.3	123.3-125.8	40.2		
8.2- 9.5	14.8	125.8-128.8	44.2		
9.5- 11.2	12.0	128.8-130.7	25.3		
11.2- 13.7	5.2	130.7-132.7	16.7		
13.7- 15.8	5.6	132.7-135.1	58.4		
15.8- 17.2	10.3	135.1-136.7	41.7		
17.2- 20.1	17.0	136.7-138.0	27.3		
20.1- 22.1	13.2	138.0-140.1	18.5		
22.1- 23.7	9.4	140.1-141.8	16.0		
23.7- 24.6	11.5	141.8-145.4	23.7		
24.6- 26.5	8.4	145.4-147.8	41.7		
26.5- 29.8	12.3	147.8-150.5	41.3		
29.8- 32.3	17.2	150.5-159.6	41.5		
32.3- 33.8	16.5	159.6-164.7	51.3		
33.8- 40.2	20.4	164.7-169.1	36.0		
40.2- 44.6	23.7	169.1-170.8	16.0		
44.6- 54.0	4.3	170.8-172.7	14.7		
54.0- 56.0	15.7	172.7-175.2	36.2		
56.0- 58.9	17.1	175.2-179.0	48.9		
58.9- 61.2	16.3	179.0-181.3	56.4		
61.2- 64.2	16.5	181.3-182.0	61.4		
64.2- 68.6	21.4	182.0-189.0	52.8		
68.6- 72.5	28.8	189.0-195.4	44.8		
72.5- 74.7	16.8	195.4-197.2	20.9		
74.7- 75.6	19.9	197.2-199.0	15.3		
75.6- 76.7	12.3	199.0-200.0	14.2		
76.7- 78.6	8.5				
78.6- 80.7	8.0				
80.7- 82.0	7.0				
82.0- 84.3	5.4				
84.3- 85.8	16.6				
85.8- 88.1	29.3				
88.1- 89.6	49.9				
89.6- 90.1	84.2				
90.1- 93.7	54.2				
93.7- 95.3	41.7				
95.3- 97.5	40.6				
97.5- 99.0	50.9				
99.0-101.1	51.8				
101.1-103.4	17.3				
103.4-113.6	4.7				
113.6-115.1	14.2				
115.1-116.3	8.4				
116.3-122.0	5.1				
122.0-123.3	23.4				



Ross Ice Shelf Traverse  
 Station Site 36.0  
 Date 1 February 1958  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.2	.1-.3		Hardened crust
0.2- 1.5	1.0/1.0-1.2	3:1	Loose with air space; cup shaped crystals
1.5- 3.0	.2-.4/.4-.8	3:1	Crust formation
3.0- 3.4	2.0-3.0/3.0-5.0	2:1	Loose with air space; cup shaped crystals
3.4- 3.8	1.0-1.3/1.3-1.5	3:1	
3.8- 6.1	.3-.5/.1-.3 occ. .7	4:1	
6.1- 16.7	.7-1.0/1.0-1.2	4:1	Slight crust at 16.7
16.7- 20.3	1.0-1.2/.8-1.0	2:1	Crust from 20.3-20.4
20.3- 22.8	1.0-1.3/.7-1.0; 1.3-1.5	3:1	Crust from 22.8-22.9
22.8- 32.7	1.2-1.4/1.0-1.2	2:1	Very slight crust at 32.7
32.7- 37.8	.7-1.0/1.0-1.2	3:1	Crust at 37.8; irregular in out- line, probably sastrugi
	.5-.7	2:1	
37.8- 42.7	.8-1.0/1.0-1.2	3:1	
42.7- 50.4	.5-.7/.7-1.0	3:1	
50.4- 54.2	1.0-1.2/.8-1.0	3:1	
54.2- 56.5	.5-.7/.7-1.0	2:1	
	.3-.5	4:1	
56.5- 59.3	1.5-2.0/2.0-3.0	2:1	Loose with air space; several small crusts throughout layer
59.3- 60.3	1.3-1.5/1.5-1.7	4:1	Crust formation
60.3- 60.7	2.0-4.0/1.0-2.0	3:1	Loose with air space; cup shaped crystals
60.7- 62.8	1.0-1.3/.8-1.0	2:1	
62.8- 66.8	1.0-1.2/1.2-1.4	3:1	Crust from 66.8-67.0
66.8- 68.9	1.0-1.3/.8-1.0	4:1	
68.9- 74.1	1.3-1.5/1.0-1.3	2:1	Crust from 74.1-74.3
	1.5-1.7	5:1	
74.1- 80.3	1.3-1.5/1.0-1.3	2:1	
80.3- 81.4	1.3-1.5/1.5-1.7	4:1	
81.4- 84.0	1.0-1.2/.8-1.0	2:1	Crust from 84.0-84.1
84.0- 91.2	.8-1.0/1.0-1.2	3:1	
91.2- 92.8	2.0-4.0/4.0-6.0	3:1	Loose; some cup shaped crystals
92.8- 94.3	.8-1.0/1.0-1.3	2:1	Crust formation
94.3- 95.3	1.5-2.0/2.0-3.0	3:1	Loose with air space; cup shaped crystals
95.3- 97.8	1.3-1.5/1.0-1.3	2:1	Crust at 97.8
97.8-105.2	1.3-1.5/1.5-1.7	3:1	
105.2-108.3	1.0-1.3/.8-1.0	2:1	
108.3-109.0	.7-1.0/1.0-1.2	4:1	
109.0-110.1	1.3-1.5/1.0-1.2	2:1	

Ross Ice Shelf Traverse  
 Station Site 36.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
110.1-112.4	1.5-1.7/1.7-2.0	3:1	
112.4-113.8	1.0-2.0/2.0-3.0	2:1	Crust from 112.4-112.6; loose with air spaces; cup shaped crystals
113.8-118.2	1.0-1.3/.8-1.0	2:1	
118.2-119.9	.7-1.0/1.0-1.2	4:1	Well packed
119.9-123.0	1.0-1.3/1.3-1.5	3:1	
123.0-123.8	2.0-4.0/1.0-2.0	3:1	Loose with air space; some cup shaped crystals
123.8-129.8	.7-1.0/1.0-1.3	2:1	
129.8-130.8	.8-1.0/1.0-1.2	4:1	
130.8-137.8	1.0-1.3/1.3-1.5	5:1	
	.8-1.0	2:1	
137.8-140.2	.7-1.0/1.0-1.3	4:1	Crust from 140.2-140.3
140.2-149.8	1.3-1.5/1.5-1.7	2:1	
149.8-150.5	3.0-5.0/5.0-7.0	4:1	Loose with air spaces; cup shaped crystals
150.5-152.2	.8-1.0/.6-.8	3:1	
152.2-155.5	1.3-1.5/1.0-1.3	3:1	Crust from 155.5-155.6
155.5-158.2	1.0-1.2/1.2-1.5	5:1	
158.2-161.8	1.0-1.3/1.3-1.5	3:1	occ. 1.7
161.8-166.8	1.0-1.3/1.3-1.5	2:1	Crust from 166.8-166.9
	.8-1.0	3:1	
166.8-175.7	1.0-1.2/1.2-1.4	4:1	
	.8-1.0	2:1	
175.7-178.8	3.0-5.0/1.0-3.0	2:1	Loose with air space; some cup shaped
178.8-182.2	1.0-1.2/.8-1.0	3:1	
182.2-184.1	1.0-1.3/1.3-1.5	4:1	
184.1-188.3	.7-1.0/.5-.7	5:1	
188.3-190.3	2.0-4.0/1.0-2.0	3:1	occ. 6.0
190.3-194.7	.8-1.0/1.0-1.2	3:1	
194.7-201.9	1.0-1.2/1.2-1.4	2:1	
201.9-203.0	1.0-1.3/1.3-1.5	2:1	
	1.7	4:1	
203.0-204.3	.8-1.0/1.0-1.2	5:1	
204.3-207.1	1.0-1.2/.7-1.0	3:1	
207.1-209.2	.6-.8/.8-1.0	3:1	Slight crust at 209.2
209.2-211.3	1.2-1.4/1.0-1.2	2:1	
211.3-212.8	1.0-1.3/.8-1.0	3:1	
212.8-215.1	.5-.7/.7-1.0	5:1	
215.1-217.7	.8-1.0/1.0-1.2	4:1	
217.7-218.4	1.3-1.5/1.5-1.7	2:1	Loose; some cup shaped crystals
218.4-225.3	1.0-1.3/.8-1.0	3:1	



Ross Ice Shelf Traverse  
 Station Site 36.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
225.3-229.8	.8-1.0/1.0-1.2	4:1	
229.8-233.7	.6-.8/1.0-1.2	3:1	
	.8-1.0	2:1	
233.7-237.4	1.2-1.4/1.0-1.2	2:1	
237.4-240.0	1.0-1.3/1.3-1.5	3:1	
240.0-241.8	.8-1.0/1.0-1.2	2:1	
241.8-244.3	.7-1.0/occ. 1.0-1.2	4:1	
	.5-.7	3:1	
244.3-248.7	1.0-1.2/1.2-1.4	5:1	
	.8-1.0	2:1	
248.7-254.3	1.3-1.5/1.5-1.7	2:1	
	1.0-1.3	4:1	
254.3-257.2	1.5-1.7/1.3-1.5 occ. 1.0	2:1	Crust from 257.2-257.4
257.2-259.2	1.5-1.7/1.7-2.0	3:1	
259.2-263.8	1.0-1.2/.8-1.0	2:1	Slight crust at 263.8
263.8-266.7	1.0-1.3/1.3-1.5	3:1	
266.7-275.1	1.0-1.2/.7-1.0	2:1	
275.1-276.4	1.5-2.0/2.0-4.0	3:1	Loose with air space; some cup shaped crystals
276.4-278.7	1.0-1.2		
278.7-281.3	1.0-1.3/1.3-1.5	2:1	
281.3-285.4	.8-1.0/1.0-1.2	3:1	
285.4-286.5	2.0-3.0/1.0-2.0	2:1	Some poorly cup shaped grains
286.5-288.6	.7-1.0/1.0-1.2	5:1	
	.5-.7	3:1	
288.6-300.0+	.6-.8/.8-1.0	2:1	

## RAM HARDNESS DATA SHEET

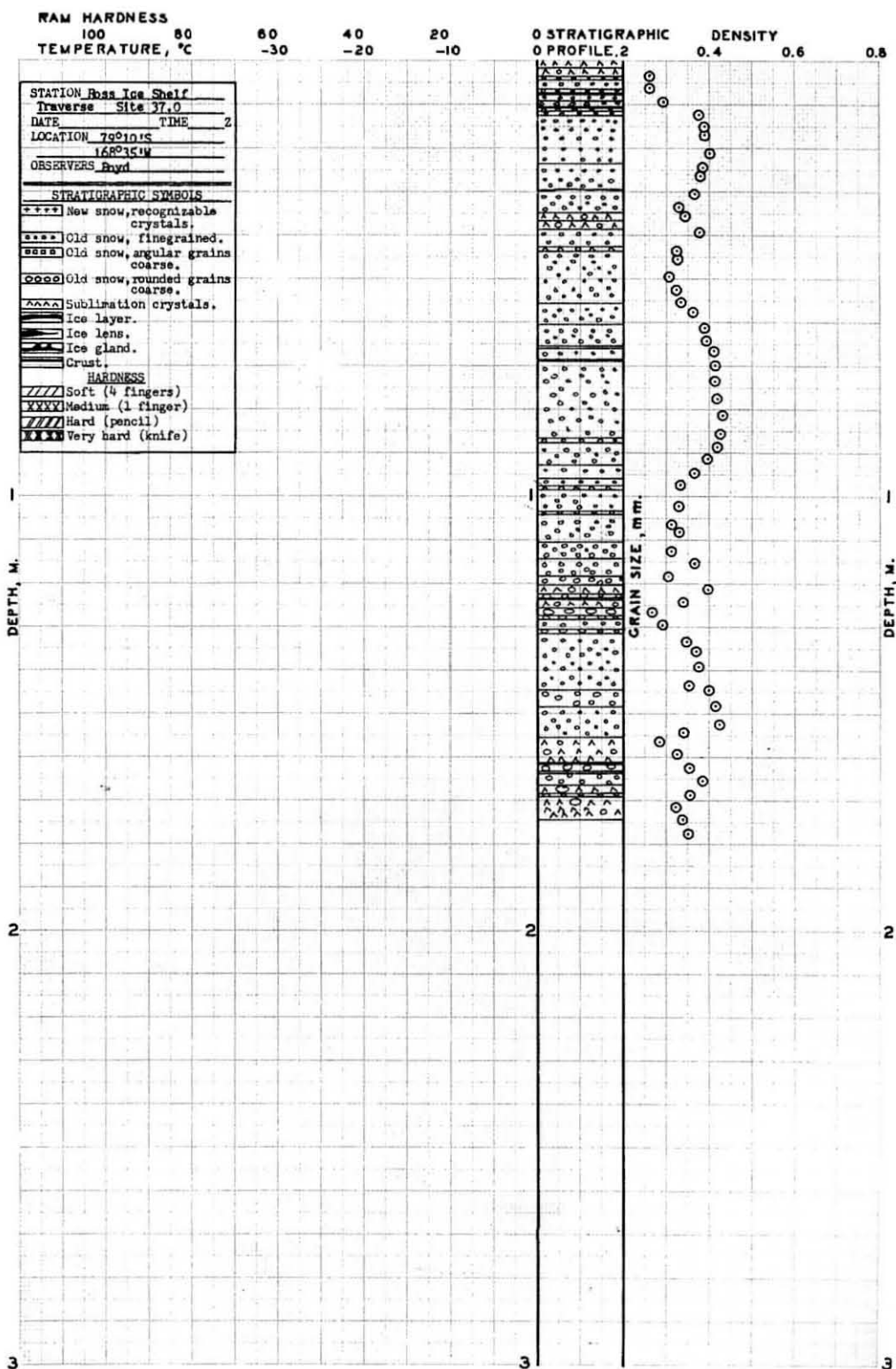
Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 36.2		132.8-137.2	42.8	63.1-65.1	25.7
February 3, 1958		137.2-140.3	46.1	65.1-68.7	19.9
0 - 6.2	3.4	140.3-144.5	18.5	68.7-73.2	18.8
6.2- 7.3	21.4	144.5-146.3	15.3	73.2-75.0	22.6
7.3- 9.0	32.6	146.3-150.4	26.7	75.0-78.5	14.6
9.0-11.0	33.2	150.3-153.6	16.3	78.5-82.9	28.2
11.0-15.1	17.9	153.6-159.0	22.7	82.9-88.1	28.2
15.1-16.0	14.3	159.0-163.7	21.2	88.1-91.1	26.5
16.0-19.3	33.5	163.7-168.7	16.2	91.1-93.8	26.4
19.3-21.7	15.7	168.7-170.5	23.7	93.8-94.9	22.4
21.7-25.3	25.4	170.5-173.1	31.1	94.9-99.2	27.5
25.3-28.5	25.1	173.1-178.3	27.3	99.2-102.6	16.0
28.5-30.8	20.6	178.3-180.8	12.2	102.6-105.1	8.2
30.8-34.2	15.0	180.8-182.7	12.1	105.1-106.5	11.4
34.2-36.0	11.5	182.7-183.1	29.2	106.5-108.7	11.0
36.0-40.2	15.1	183.1-185.0	51.6	108.7-110.9	11.0
40.2-41.6	10.4	185.0-186.9	114.7	110.9-113.7	11.4
41.6-46.3	4.3	186.9-189.0	170.9	113.7-114.6	9.8
46.3-47.9	9.5	189.0-190.0	188.5	114.6-115.3	18.5
47.9-49.3	10.3	190.0-192.8	109.5	115.3-116.7	68.6
49.3-51.8	11.2	192.8-194.8	54.2	116.7-119.9	60.4
51.8-54.0	12.3	194.8-198.0	51.0	119.9-120.5	54.2
54.0-56.1	15.1	198.0-198.7	90.0	120.5-122.0	24.2
56.1-58.2	19.9	198.7-199.7	19.2	122.0-123.6	10.4
58.2-60.3	22.3			123.6-124.5	9.8
60.3-64.2	23.7			124.5-125.7	8.4
64.2-66.0	42.1	Station 36.4		125.7-127.9	6.5
66.0-71.4	62.4	February 3, 1958		127.9-129.0	13.3
71.4-75.1	57.4	0 - 5.0	3.4	129.0-130.4	18.5
75.1-76.3	44.9	5.0- 12.6	5.2	130.4-131.0	29.2
76.3-79.2	34.3	12.6- 14.2	6.4	131.0-134.2	29.2
79.2-80.5	14.7	14.2- 17.6	4.7	134.2-137.5	22.4
80.5-82.6	5.6	17.6- 18.8	11.5	137.5-140.6	26.8
82.6-90.5	3.8	18.8- 20.6	14.3	140.6-146.5	24.5
90.5-92.5	8.2	20.6- 23.4	13.9	146.5-150.0	32.8
92.5-95.1	10.9	23.4- 25.1	20.9	150.0-151.4	47.1
95.1-97.0	17.4	25.1- 28.3	22.0	151.4-154.2	54.2
97.0-101.0	20.5	28.3- 31.8	17.5	154.2-156.3	70.8
101.0-103.1	23.3	31.8- 35.1	21.4	156.3-162.2	99.2
103.1-105.6	60.2	35.1- 37.0	40.1	162.2-165.6	63.0
105.6-107.7	61.4	37.0- 40.3	39.6	165.6-167.7	32.8
107.7-109.8	18.5	40.3- 43.6	27.5	167.7-170.8	17.1
109.8-118.2	4.8	43.6- 46.3	18.0	170.8-173.2	32.8
118.2-120.3	13.7	46.3- 50.4	14.1	173.2-178.3	37.5
120.3-123.5	18.3	50.4- 54.5	17.8	178.3-182.8	44.2
123.5-127.3	22.6	54.5- 59.2	13.8	182.8-187.8	36.2
127.3-132.8	27.8	59.2- 61.4	7.7	187.8-190.0	17.9
		61.4- 63.1	17.9		

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
190.0-193.1	26.8				
193.1-195.9	36.6				
195.9-199.0	49.4				
199.0-199.7	61.3				



Ross Ice Shelf Traverse  
 Station Site 37.0  
 Date \_\_\_\_\_  
 Observer Boyd

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.3			Crust with hoarfrost on sur- face
0.3- 1.7	2.0-4.0/1.0-2.0	3:1	Loose crystals; mostly air space; cup shaped crystals
1.7- 3.3	2.0-3.0/1.0-2.0	2:1	Loose with air space; cup shaped crystals
3.3- 4.1	.6-.8/.3-.6	2:1	
4.1- 6.5	.3-.6/.1-.3	2:1	Slight crust at 6.5
6.5- 7.4	.8-1.0/.6-.8	3:1	Crust from 7.4-7.5; loose with air space
7.4- 9.2	.6-.8/.4-.6	3:1	Crust at 9.2
9.2- 10.8	1.0-1.3/.7-1.0	2:1	Crust from 10.8-10.9
10.8- 11.9	1.0-1.2/.8-1.0	3:1	
11.9- 12.1	.3-.6		Well cemented crust formation
12.1- 23.2	.6-.8/.4-.6	3:1	
23.2- 29.1	.6-.8/.8-1.0	4:1	
29.1- 34.8	.8-1.0/1.0-1.2	3:1	Ice layer or crust from 29.1- 29.2
34.8- 36.7	1.5-2.0/2.0-3.0	2:1	Loose with air space; some cup shaped crystals
36.7- 38.3	1.5-2.0/1.0-1.5 occ. 3.0	2:1	Loose with air space; some cup shaped crystals
38.3- 42.2	.3-.5/.5-.7	3:1	Slight crust at 38.3; well packed
42.2- 43.1	2.0-4.0/1.5-2.0	2:1	Slight crust at 42.2; loose with air space; some cup shaped crystals
43.1- 55.4	1.0-1.2/.8-1.0	2:1	
55.4- 60.4	.7-1.0/1.0-1.2	5:1	Slight crust at 55.4
60.4- 65.8	.7-1.0/1.0-1.3	3:1	Crust at 65.8
65.8- 68.3	.6-.8/.8-1.0	4:1	Slight crust at 68.3
68.3- 86.4	.8-1.0/.6-.8 occ. 1.2	4:1	
86.4- 87.5	.6-.8/.8-1.0	3:1	
	.4-.6	4:1	
87.5- 92.7	.8-1.0/1.0-1.2	3:1	
92.7- 95.8	.6-.8/.4-.6	4:1	
95.8- 97.4	.5-.7/.7-1.0	5:1	
97.4- 98.6	2.0-4.0/1.0-2.0	3:1	Loose grains with air space; cup shaped crystals
98.6-103.6	.6-.8/.8-1.0	2:1	Well packed
103.6-104.0	.8-1.0/1.0-1.2	3:1	
104.0-110.3	1.2-1.4/1.0-1.2	3:1	
110.3-114.1	1.0-1.3/1.3-1.5	2:1	

Ross Ice Shelf Traverse  
 Station Site 37.0  
 (Continued)

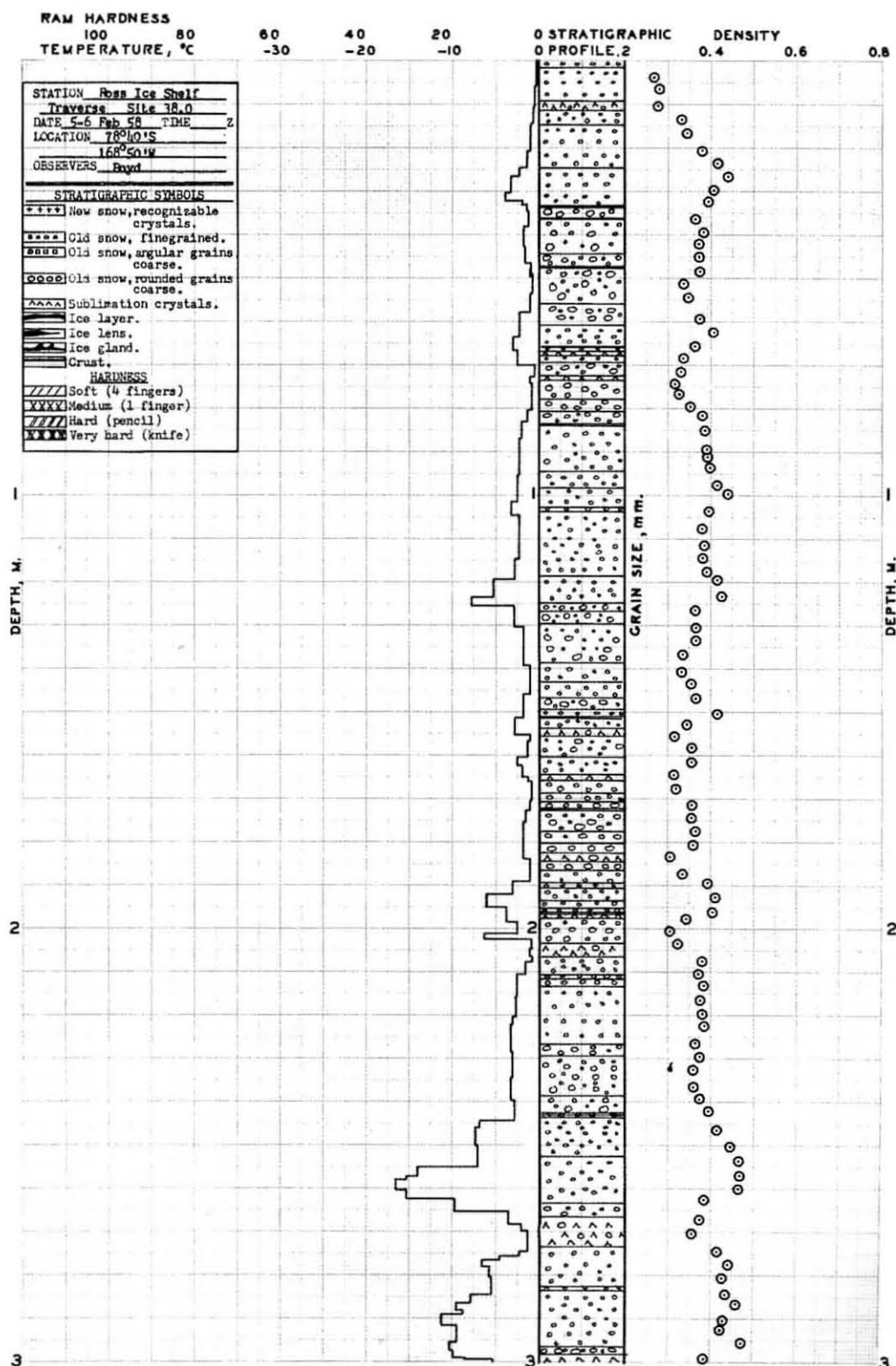
Depth cm	Grain Size	Ratio	Remarks
114.1-118.2	.7-1.0/1.0-1.2	3:1	
118.2-120.1	1.0-1.2/1.2-1.4	3:1	
120.1-122.2	2.0-4.0/4.0-5.0	3:1	Loose with air space; cup shaped crystals
122.2-123.4	1.0-1.3/1.3-1.5	2:1	Crust from 123.4-123.6
123.4-125.6	1.0-2.0/2.0-4.0	3:1	Some cup shaped crystals
125.6-127.1	1.5-2.0/2.0-3.0	2:1	Loose with air space
127.1-127.7	1.3-1.5		Crust formation
127.7-129.1	2.0-4.0/1.0-2.0	3:1	Loose with air space
129.1-130.5	.8-1.0/1.0-1.2	2:1	
130.5-131.3	1.0-1.3/.8-1.0	3:1	
131.3-144.2	.8-1.0/1.0-1.2	2:1	
144.2-148.3	1.3-1.5/1.0-1.3	2:1	
148.3-155.3	.7-1.0/1.0-1.2	4:1	
	.5-.7	3:1	
155.3-161.4	2.0-4.0/4.0-6.0	3:1	Loose; cup shaped crystals
161.4-163.5	2.0-4.0/1.0-2.0	2:1	Slight crust at 163.5
163.5-166.3	1.0-1.3/.8-1.0	3:1	
166.3-168.6	3.0-5.0/5.0-7.0	2:1	Cup shaped crystals
168.6-169.0	1.3-1.5/1.0-1.3	4:1	Crust formation
169.0-174.6	2.0-4.0/1.0-2.0	2:1	Cup shaped crystals

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 37.2		119.8-120.9	77.0		
February 5, 1958		120.9-123.7	79.2		
0 = 3.8	3.5	123.7-126.1	29.2		
3.8-5.7	24.3	126.1-128.5	20.9		
5.7-7.3	58.4	128.5-130.5	14.2		
7.3-8.7	88.8	130.5-133.4	12.8		
8.7-10.1	110.3	133.4-136.6	13.6		
10.1-12.0	98.0	136.6-139.0	20.9		
12.0-15.4	91.4	139.0-144.8	26.6		
15.4-17.3	50.6	144.8-146.4	23.0		
17.3-19.1	36.5	146.4-149.3	9.4		
19.1-22.0	41.1	149.3-150.7	14.9		
22.0-24.9	37.7	150.7-152.0	31.1		
24.9-30.7	32.6	152.0-154.9	35.2		
30.7-33.0	46.7	154.9-156.3	18.5		
33.0-35.6	34.0	156.3-159.9	11.1		
35.6-40.0	25.9	159.9-161.3	22.1		
40.0-41.9	13.7	161.3-165.1	35.8		
41.9-44.4	19.2	165.1-170.1	40.2		
44.4-48.0	25.4	170.1-175.5	37.5		
48.0-50.0	33.2	175.5-177.3	37.6		
50.0-51.7	38.5	177.3-178.0	89.8		
51.7-55.3	31.0	178.0-180.1	175.7		
55.3-59.2	28.8	180.1-183.1	154.2		
59.2-62.1	34.2	183.1-185.2	104.2		
62.1-66.0	39.1	185.2-190.2	108.2		
66.0-68.1	46.0	190.2-192.9	82.0		
68.1-70.0	24.3	192.9-194.4	44.2		
70.0-71.8	14.3	194.4-198.5	23.7		
71.8-74.0	16.9	198.5-200.0	17.6		
74.0-75.7	32.6				
75.7-76.2	23.2				
76.2-80.7	21.0				
80.7-83.1	15.7				
83.1-85.0	13.7				
85.0-88.5	11.8				
88.5-90.2	20.9				
90.2-91.0	35.5				
91.0-94.0	34.2				
94.0-95.9	25.3				
95.9-101.4	24.6				
101.4-103.3	20.0				
103.3-105.7	12.5				
105.7-109.8	12.7				
109.8-114.5	25.5				
114.5-116.7	17.9				
116.7-119.8	30.0				





Ross Ice Shelf Traverse  
 Station Site 38.0  
 Date 5-6 February 1958  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 1.4	.5-.7/.3-.5	3:1	
1.4- 9.1	.1-.2/.3-.5	7:1	
9.1- 11.6	1.0-2.0/2.0-2.5	4:1	Cup and prism shaped crystals; loose with air space
11.6- 14.9	.5-.7/.7-1.0	4:1	
	.3-.5	2:1	
14.9- 24.4	.8-1.0/.6-.8	3:1	
24.4- 33.2	.6-.8/.3-.6	2:1	Crust from 33.2-33.3
33.2- 36.3	1.0-1.5/1.5-1.7	3:1	Loose grains; crust from 36.3- 36.4
36.3- 44.4	.8-1.0/1.0-1.2	4:1	
44.4- 47.1	1.0-1.2/.8-1.0	3:1	Crust from 47.1-47.2
47.1- 55.8	1.0-1.3/1.3-1.5	3:1	
	.8-1.0	2:1	
55.8- 60.8	1.3-1.5/1.5-1.7	3:1	Loose grains
60.8- 65.4	.6-.8/.8-1.0	2:1	Very slight crust at 65.4
65.4- 66.8	.8-1.0/1.0-1.2	4:1	Crust from 66.8-66.9
66.8- 67.7	1.3-1.5/1.5-1.7 occ. 2.0	2:1	Loose with air space; some cup shaped crystals
67.7- 69.3	.5-.7/.7-1.0	2:1	
69.3- 72.1	1.0-1.2/.8-1.0	3:1	Crust at 72.1
72.1- 73.6	1.5-2.0/2.0-3.0	3:1	Loose with air space; some cup shaped crystals
73.6- 77.8	1.5-1.7/1.7-2.0	2:1	Loose
77.8- 80.6	1.0-1.3/1.3-1.5	2:1	
80.6- 83.3	1.0-1.3/1.3-1.5	3:1	Slight crust at 83.3
	1.5-1.7	2:1	
83.3- 94.6	1.3-1.5/1.5-1.7	3:1	
94.6- 98.2	.8-1.0/1.0-1.2	4:1	
98.2-102.8	.6-.8/.8-1.0	3:1	
102.8-103.5	1.0-1.2/1.2-1.4	3:1	
103.5-118.2	.8-1.0/1.0-1.2	4:1	
118.2-118.7	1.3-1.5/1.0-1.3	2:1	
118.7-124.9	.6-.8/.8-1.0	3:1	Hard packed
124.9-126.7	.8-1.0/1.0-1.2	2:1	
126.7-129.8	1.0-1.3/1.3-1.5	3:1	
129.8-138.3	.7-1.0/1.0-1.3	2:1	
138.3-143.0	1.3-1.5/1.0-1.3	3:1	
143.0-146.7	1.0-1.2/1.2-1.4	4:1	
146.7-149.2	1.3-1.5/1.0-1.3	2:1	
149.2-151.0	1.0-1.2/.8-1.0	3:1	Crust from 151.0-151.1
151.0-153.9	.6-.8/.8-1.0	3:1	
153.9-155.2	1.5-2.0/2.0-3.0	4:1	Loose; some cup shaped crystals

Ross Ice Shelf Traverse  
Station Site 38.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
155.2-160.1	1.0-1.2/.8-1.0	3:1	
160.1-164.8	.8-1.0/.6-.8	3:1	Hard packed
164.8-165.9	2.0-4.0/1.0-2.0	2:1	Loose; cup shaped crystals
165.9-168.8	1.0-1.2/1.2-1.4	4:1	Slight crust at 168.8
168.8-170.8	1.0-1.3/.7-1.0	2:1	
170.8-172.3	1.0-1.3/1.3-1.5	3:1	Crust from 172.3-172.4
172.3-177.7	.8-1.0/1.0-1.2	2:1	
177.7-180.3	1.0-1.2/1.2-1.4	2:1	
180.3-182.4	1.0-1.3/1.3-1.5	3:1	
182.4-184.6	2.0-3.0/1.0-2.0	3:1	Loose; some cup shaped crystals
184.6-186.3	1.5-2.0/2.0-3.0	4:1	
186.3-189.4	.7-1.0/1.0-1.2	2:1	
189.4-190.6	.5-.7/.7-1.0	3:1	
190.6-193.8	.3-.5/.5-.7 occ. 1.0	4:1	
193.8-195.1	.7-1.0/.5-.7	3:1	
195.1-196.3	.3-.5/.5-.7	2:1	Crust from 196.3-196.4
	.7-1.0	4:1	
196.3-197.8	1.0-2.0/2.0-4.0	3:1	Loose; some cup shaped grains
197.8-203.3	1.0-1.3/1.3-1.5	4:1	
203.3-206.2	3.0-5.0/1.0-3.0	2:1	Loose with air space; some cup shaped crystals
206.2-210.8	.8-1.0/1.0-1.2	3:1	
210.8-211.4	1.0-1.2/1.2-1.4	2:1	
211.4-213.1	1.0-1.3/1.3-1.5	4:1	
213.1-226.8	.6-.8/.8-1.0	3:1	Crust from 226.8-226.9
	1.0-1.2	5:1	
226.8-229.4	1.0-1.3/1.3-1.5	4:1	Slight crust at 229.4
	.8-1.0	2:1	
229.4-238.3	.8-1.0/1.0-1.2	5:1	
238.3-242.4	.8-1.0/1.0-1.3	2:1	Crust from 242.4-242.5
242.4-243.7	1.3-1.5/1.0-1.3	3:1	Slightly cemented; slight crust at 243.7
243.7-252.2	.6-.8/.8-1.0	4:1	
252.2-263.4	.6-.8/.4-.6	3:1	Very hard packed
263.4-266.8	1.0-1.2/.8-1.0	2:1	
266.8-273.3	1.5-2.0/2.0-4.0 occ. 6.0	2:1	Loose; some cup shaped grains
273.3-282.8	.8-1.0/1.0-1.2	3:1	
282.8-283.6	1.0-1.2/.7-1.0	2:1	Crust from 283.6-283.7
283.6-296.6	.8-1.0/.6-.8	3:1	Hard packed
296.6-298.8	1.0-1.3/1.3-1.5	4:1	
	.8-1.0	2:1	
298.8-303.0	2.0-4.0/1.0-2.0	3:1	Loose; some cup shaped crystals

# RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 38.2		153.0-157.3	13.5	83.2-85.7	31.2
February 7, 1958		157.3-161.1	13.4	85.7-89.8	32.5
0 - 6.3	3.4	161.1-164.0	38.7	89.8-90.9	21.4
6.3-8.2	13.7	164.0-167.2	60.5	90.9-92.7	9.8
8.2-10.5	16.3	167.2-170.4	41.7	92.7-97.8	6.2
10.5-13.3	12.1	170.4-174.1	31.2	97.8-99.8	19.2
13.3-26.7	3.9	174.1-178.8	36.1	99.8-104.0	32.8
26.7-28.0	26.3	178.8-180.1	50.4	104.0-107.3	40.6
28.0-29.6	22.0	180.1-183.6	49.9	107.3-109.8	28.2
29.6-34.1	25.4	183.6-189.2	29.2	109.8-112.1	21.6
34.1-38.3	27.0	189.2-194.1	49.1	112.1-115.7	15.3
38.3-40.4	27.0	194.1-195.1	54.2	115.7-118.3	19.6
40.4-44.2	19.0	195.1-197.7	65.8	118.3-120.3	34.2
44.2-46.7	23.2	197.7-199.8	89.9	120.3-123.0	86.6
46.7-49.7	16.5			123.0-126.2	88.6
49.7-51.6	19.0	Station 38.4		126.2-130.8	87.6
51.6-57.3	27.8	February 7, 1958		130.8-133.2	66.7
57.3-58.9	53.2	0 - 8.3	3.3	133.2-135.2	29.2
58.9-60.2	49.4	8.3-10.6	9.7	135.2-138.6	21.9
60.2-61.6	24.6	10.6-13.7	4.8	138.6-145.5	24.5
61.6-65.4	19.0	13.7-16.5	6.8	145.5-149.8	22.8
65.4-68.1	47.6	16.5-23.6	3.9	149.8-155.3	27.8
68.1-71.2	42.0	23.6-25.4	8.8	155.3-158.6	34.5
71.2-74.2	29.9	25.4-27.6	10.0	158.6-161.3	48.7
74.2-75.6	31.8	27.6-30.7	11.3	161.3-164.2	35.3
75.6-78.3	14.3	30.7-34.3	15.7	164.2-165.7	24.2
78.3-80.4	12.7	34.3-35.9	15.7	165.7-168.6	18.0
80.4-83.1	18.0	35.9-38.0	27.0	168.6-171.3	26.4
83.1-85.1	23.2	38.0-39.1	48.7	171.3-175.6	36.8
85.1-88.3	18.8	39.1-40.0	69.9	175.6-177.8	58.8
88.3-89.5	20.9	40.0-43.2	78.2	177.8-180.2	54.2
89.5-93.0	21.4	43.2-46.4	78.2	180.2-184.5	53.0
93.0-96.9	35.0	46.4-48.8	65.7	184.5-187.3	47.1
96.9-101.0	43.2	48.8-50.7	50.6	187.3-189.2	35.8
101.0-104.2	26.1	50.7-55.3	35.4	189.2-190.9	21.9
104.2-107.7	21.4	55.3-58.1	38.9	190.9-194.1	13.6
107.7-110.8	20.3	58.1-59.9	25.4	194.1-196.0	20.0
110.8-115.4	34.7	59.9-64.7	24.0	196.0-198.6	35.0
115.4-119.8	49.7	64.7-66.3	28.2	198.6-199.8	45.9
119.8-123.2	66.0	66.3-69.7	26.7		
123.2-125.5	30.3	69.7-70.4	17.5		
125.5-130.2	29.7	70.4-72.0	15.7		
130.2-137.2	38.5	72.0-74.8	8.6		
137.2-140.4	41.7	74.8-75.7	8.8		
140.4-148.2	28.6	75.7-77.6	8.5		
148.2-150.7	28.2	77.6-81.9	5.5		
150.7-153.0	17.3	81.9-83.2	14.7		



Ross Ice Shelf Traverse  
 Station Site 39.0  
 Date 7-8 February 1958  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 2.2	1.0-3.0		Crust from 2.2-2.3
2.2- 5.7	2.0-4.0/4.0-5.0	3:1	Loose with air space; cup shaped crystals
5.7- 11.5	.3-.6/.6-.8	2:1	
11.5- 31.5	.6-.8/.3-.6	3:1	
31.5- 36.9	.8-1.0/.6-.8	4:1	Crust from 31.5-31.6
36.9- 47.3	.7-1.0/1.0-1.2	4:1	Crust from 36.9-37.0
47.3- 52.2	1.0-1.3/1.3-1.5	2:1	
	.8-1.0	5:1	
52.2- 61.1	1.0-1.2/.8-1.0	3:1	Crust from 61.1-61.2
61.1- 64.3	1.0-1.2/1.2-1.4	4:1	
64.3- 68.2	1.0-1.3/1.3-1.5	3:1	
68.2- 73.6	1.0-1.2/.8-1.0	4:1	Slight crust at 73.6
73.6- 74.3	.8-1.0/1.0-1.2	3:1	Slight crust at 74.4
74.3- 76.8	.8-1.0/.6-.8	4:1	
	1.0-1.2	6:1	
76.8- 77.2	1.3-1.5		Cemented crust formation
77.2- 79.5	.2-.4/.4-.6	4:1	Wind slab; slight crust at 79.5
79.5- 81.6	3.0-5.0/1.0-3.0	4:1	Loose grains with air space; some cup shaped crystals
81.6- 84.4	.6-.8/.8-1.0	2:1	Ice layer 84.4-84.6
84.4- 85.4			Ice layer with cemented grains
85.4- 86.7	1.5-1.7/1.3-1.5	4:1	
86.7- 87.5	1.5-1.7/1.7-2.0	3:1	Crust from 87.5-87.6
87.5- 91.2	1.0-1.3/.8-1.0	2:1	
91.2- 94.0	1.0-1.3/1.3-1.5	4:1	Crust from 94.0-94.1
	.8-1.0	2:1	
94.0- 97.5	1.0-1.3/1.3-1.5	6:1	
97.5- 98.2	1.3-1.5		
98.2-117.1	1.0-1.2/.8-1.0	5:1	
117.1-121.3	1.0-1.3/1.3-1.5	2:1	
121.3-124.7	.8-1.0/.6-.8	4:1	Hard packed
124.7-124.9	1.0-1.3/1.3-1.5	3:1	
124.9-131.3	.8-1.0/1.0-1.2	3:1	
131.2-133.1	1.0-1.3/.7-1.0	4:1	
133.1-134.8	1.3-1.5/1.0-1.3	4:1	
134.8-138.0	.8-1.0/1.0-1.2	5:1	
138.0-139.4	1.2-1.4/1.0-1.2	2:1	
139.4-140.4	1.0-1.2/1.2-1.5	4:1	
140.4-142.6	2.0-3.0/1.5-2.0	3:1	Crust at 142.6-142.7; some cup shaped crystals
142.6-143.3	1.3-1.5/1.5-1.7	2:1	Loose
143.3-146.7	1.0-1.2/.8-1.0	3:1	Crust from 146.7-146.8

Ross Ice Shelf Traverse  
Station Site 39.0  
(Continued)

Depth cm	Grain Size	Ratio	Remarks
146.7-148.1	.8-1.0/1.0-1.2	2:1	
148.1-151.4	1.0-2.0/2.0-4.0	3:1	Some crust shaped; crust at 151.4-151.5
151.4-154.5	.8-1.0/1.0-1.2	3:1	Loose
154.4-162.3	.7-1.0/.5-.7	3:1	Slight crust at 162.3
	1.0-1.2	5:1	
162.3-162.7	1.0-1.2/1.2-1.4	3:1	Crust from 162.7-162.8
162.7-165.4	1.0-1.3/.7-1.0	2:1	
165.4-167.1	1.0-1.3/1.3-1.5	3:1	Crust from 167.1-167.2
167.1-168.3	.7-1.0/1.0-1.2	4:1	
168.3-169.7	1.3-1.5/1.0-1.3	3:1	
169.7-175.2	.8-1.0/1.0-1.2	4:1	
175.2-176.3	1.3-1.5/1.0-1.3	3:1	
176.3-177.5	.7-1.0/1.0-1.2	4:1	Slight crust at 177.5
177.5-180.4	1.0-1.2/.8-1.0	2:1	Slight crust at 178.1
180.4-180.7	1.5-2.0/2.0-4.0	3:1	Loose
180.7-181.7	.8-1.0/1.0-1.2	4:1	
181.7-188.4	1.5-1.7/1.7-2.5	4:1	Some cup shaped crystals; loose
188.4-190.5	1.7-2.5/1.5-1.7	3:1	
	1.3-1.5	5:1	
190.5-193.4	1.0-1.3/1.3-1.5	3:1	
193.4-196.6	1.0-1.2/.8-1.0	2:1	
196.6-206.8	.5-.7/.7-1.0	5:1	Hard packed; crust from 206.8-206.9
206.8-218.8	1.0-1.3/1.3-1.5	2:1	Crust at 218.8-218.9
218.8-222.4	1.0-1.2/.8-1.0	3:1	Crust at 222.4-222.5
222.4-234.3	1.0-1.2/1.2-1.4	5:1	Crust from 234.3-234.4
234.3-239.4	.8-1.0/1.0-1.2	2:1	Crust at 239.4-239.5
239.4-251.9			Ice layer
251.9-252.3	.7-1.0/1.0-1.3	3:1	
252.3-264.2	.5-.7/.7-1.0	2:1	
264.2-272.2	1.0-1.3		
272.2-272.7	.4-.6/.6-.8	2:1	Hard packed
272.7-275.8	1.0-1.2/.8-1.0	3:1	
275.8-280.3	1.2-1.4/1.0-1.2	3:1	Crust at 280.3-280.4
280.3-281.1	.7-1.0/1.0-1.2	4:1	
281.1-282.2	1.0-1.3/1.3-1.5	4:1	Slightly cemented
282.2-282.8	.3-.6/.6-.8	2:1	
282.8-289.6	1.0-1.3/1.3-1.5	2:1	
289.6-300.0+			



# RAM HARDNESS DATA SHEET

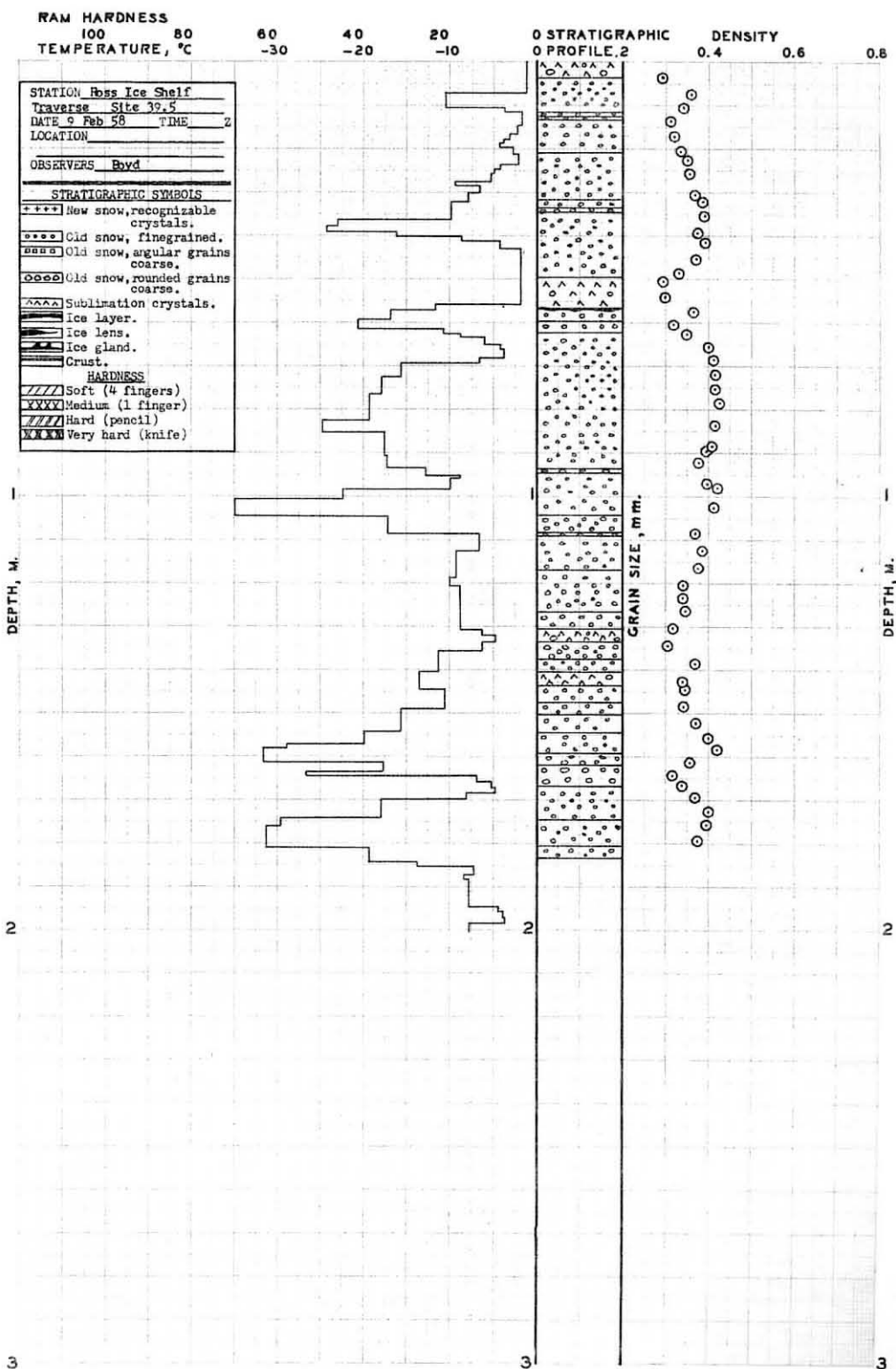
Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 39.2		125.1-128.1	110.7	38.3-41.1	42.5
February 9, 1958		128.1-131.6	158.5	41.1-45.3	65.2
0 - 7.6	3.3	131.6-135.0	127.7	45.3-48.6	66.8
7.6-22.4	3.5	135.0-136.3	96.4	48.6-49.5	36.5
22.4-23.8	10.3	136.3-139.2	52.5	49.5-52.1	26.3
23.8-26.8	4.9	139.2-142.1	38.7	52.1-54.2	50.8
26.8-27.9	16.9	142.1-145.1	34.2	54.2-58.3	27.6
27.9-29.0	35.0	145.1-147.3	45.1	58.3-60.0	9.1
29.0-30.4	60.4	147.3-148.1	16.7	60.0-63.2	18.8
30.4-32.1	62.0	148.1-149.2	13.3	63.2-65.4	30.5
32.1-34.1	63.2	149.2-156.7	4.9	65.4-68.7	27.4
34.1-35.3	53.2	156.7-157.1	29.2	68.7-74.1	43.9
35.3-37.0	50.3	157.1-158.8	51.3	74.1-76.2	46.1
37.0-39.8	35.3	158.8-161.2	54.2	76.2-78.3	17.5
39.8-41.1	30.1	161.2-164.0	43.5	78.3-80.6	46.7
41.1-45.3	34.1	164.0-166.9	59.4	80.6-81.1	13.2
45.3-47.0	44.4	166.9-171.0	38.4	81.1-81.7	11.5
47.0-49.0	53.2	171.0-172.8	15.3	81.7-84.2	31.2
49.0-51.0	38.2	172.8-174.1	15.8	84.2-87.1	37.7
51.0-52.2	19.9	174.1-176.3	45.1	87.1-89.1	43.2
52.2-53.1	14.3	176.3-179.8	49.9	89.1-91.2	42.3
53.1-55.5	11.5	179.8-182.0	49.7	91.2-95.0	41.0
55.5-57.8	18.4	182.0-184.1	56.6	95.0-99.4	40.5
57.8-60.0	30.5	184.1-190.3	55.8	99.4-104.4	26.2
60.0-61.7	26.7	190.3-192.9	42.7	104.4-108.3	27.3
61.7-63.1	17.5	192.9-196.2	34.5	108.3-111.2	35.2
63.1-65.3	21.4	196.2-199.3	42.9	111.2-115.2	44.2
65.3-67.9	30.1	199.3-200.0	32.8	115.2-116.9	127.7
67.9-70.8	37.7			116.9-120.5	129.2
70.8-73.1	46.9	Station 39.4		120.5-122.0	57.6
73.1-75.4	38.0	February 9, 1958		122.0-124.7	33.8
75.4-77.0	28.2	0 - 5.2	3.4	124.7-126.6	14.7
77.0-79.2	16.8	5.2-7.7	7.2	126.6-128.8	15.6
79.2-82.2	14.9	7.7-9.6	5.8	128.8-130.9	16.1
82.2-85.2	26.5	9.6-10.9	7.0	130.9-133.2	17.3
85.2-87.0	42.1	10.9-12.0	12.3	133.2-136.0	32.8
87.0-90.5	37.4	12.0-13.0	23.2	136.0-140.5	44.2
90.5-97.0	53.4	13.0-15.9	37.7	140.5-142.1	48.0
97.0-101.7	63.8	15.9-19.1	40.7	142.1-144.3	40.6
101.7-103.7	64.2	19.1-20.9	31.0	144.3-148.7	8.8
103.7-107.0	37.6	20.9-24.3	26.7	148.7-150.4	13.0
107.0-109.1	32.8	24.3-27.6	33.5	150.4-152.9	12.2
109.1-114.0	36.9	27.6-30.0	94.9	152.9-154.1	20.9
114.0-117.6	76.4	30.0-32.1	160.3	154.1-155.7	35.4
117.6-119.0	125.7	32.1-34.2	122.3	155.7-159.4	69.0
119.0-122.2	129.2	34.2-35.4	69.8	159.4-161.3	83.2
122.2-125.1	107.7	35.4-38.3	44.5	161.3-164.0	63.4

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
164.0-167.0	24.2				
167.0-170.2	35.5				
170.2-172.3	42.3				
172.3-173.6	19.6				
173.6-176.0	25.0				
176.0-180.1	35.9				
180.1-184.3	37.5				
184.3-189.1	31.3				
189.1-190.0	37.6				
190.0-195.3	53.3				
195.3-196.1	79.2				
196.1-199.4	40.6				



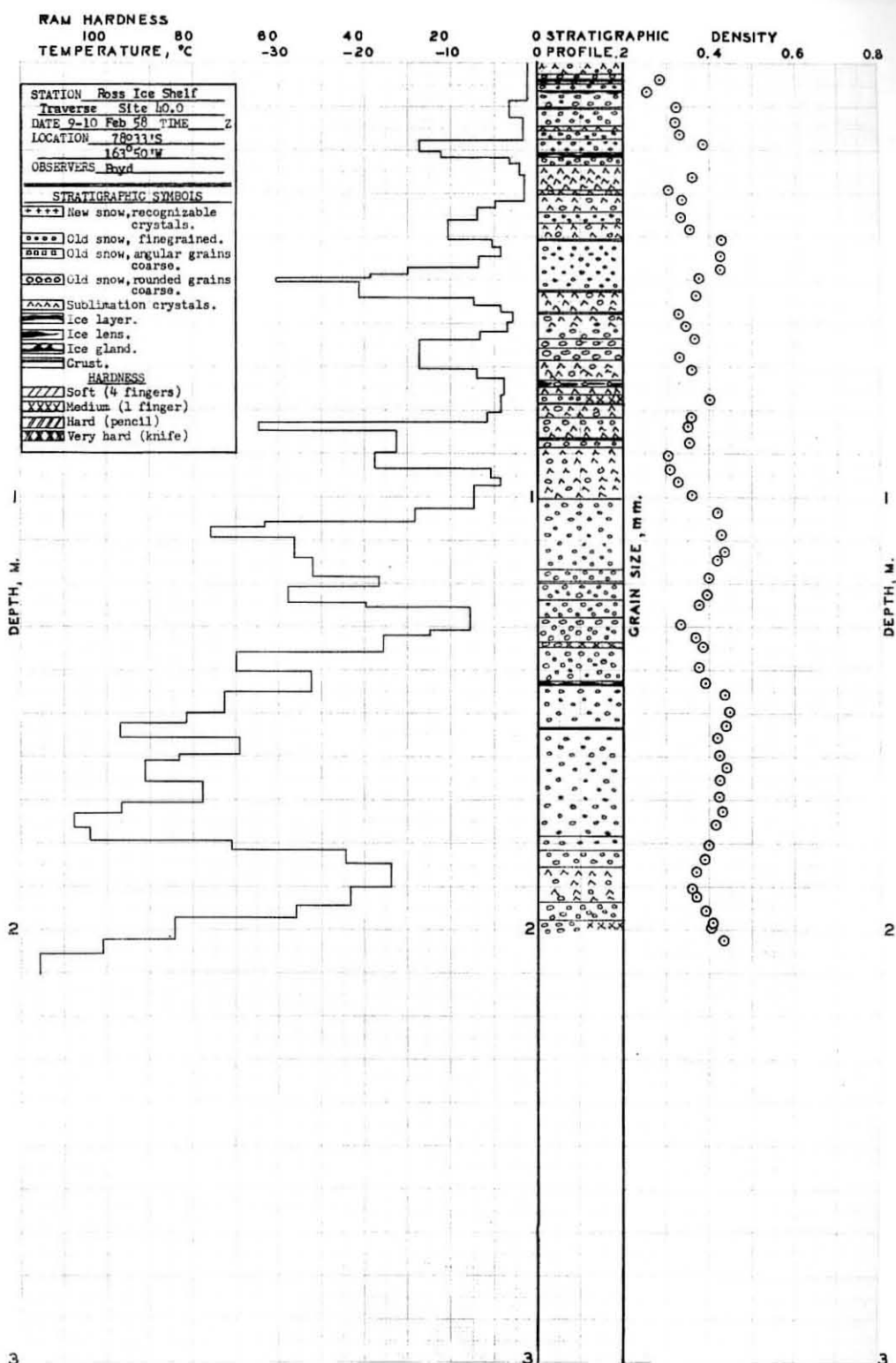
Ross Ice Shelf Traverse  
 Station Site 39.5  
 Date 9 February 1958  
 Observer Boyd

# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.4	.6-.8/.4-.6	3:1	Crust; slightly cemented
0.4- 3.6	1.0-3.0/3.0-5.0	4:1	Loose with air spaces; cup shaped crystals
3.6- 11.5	.2-.4/.4-.6	3:1	
	.6-.8	2:1	
11.5- 12.6	1.0-1.2/.7-1.0	3:1	Loose
12.6- 13.1	.6-.8/.4-.6	3:1	Lens form
13.1- 20.7	.8-1.0/1.0-1.2	4:1	Crust at 20.7
	.6-.8	3:1	
20.7- 31.5	.6-.8/.8-1.0	3:1	Slight crust at 31.5
31.5- 33.8	.5-.7/.7-1.0	2:1	Slight crust at 33.8
33.8- 34.5	1.0-1.2/.8-1.0	3:1	Loose with few air spaces
34.5- 49.7	.4-.6/.6-.8	2:1	Start of probable summer zone;
	.8-1.0	5:1	crust from 49.7-49.8
49.7- 56.4	2.0-4.0/1.0-2.0	4:1	Loose with air space; some cup shaped crystals
56.4- 56.7			Ice layer
56.7- 59.8	.8-1.0/1.0-1.2	3:1	
59.8- 62.1	1.0-3.0/3.0-5.0	4:1	Crust at 59.8-60.0; loose with air space
62.1- 93.7	.3-.6/.6-.8	2:1	Heavy ice lens at 71.7-72.5;
	.8-1.0	4:1	79.2-82.0; 85.5-86.8; 66.5-68.7; 90.0-91.8
93.7- 94.2	1.0-1.3/.8-1.0	3:1	Crust from 93.7-93.9
94.2-104.1	.6-.8/.8-1.0	4:1	
104.1-108.3	1.0-1.2/.8-1.0	3:1	
108.3-108.8	1.3-1.5/1.0-1.3	4:1	Loose; some cup shaped grains
108.8-117.0	.8-1.0/.6-.8	2:1	Slight crust at 117.0
117.0-126.8	1.0-1.3/1.3-1.5	5:1	
126.8-130.2	1.0-1.2/1.2-1.4	3:1	Crust at 130.2-130.3
130.2-133.3	1.0-2.0/2.0-4.0	3:1	Crust from 133.3-133.4; some cup shaped crystals
133.3-137.3	1.0-1.3/.7-1.0	4:1	
137.3-140.5	.6-.8/.8-1.0	2:1	
140.5-143.6	2.0-4.0/1.0-2.0	5:1	Loose; some cup shaped crystals
143.6-147.4	.8-1.0/1.0-1.3	3:1	
147.4-150.2	1.0-1.2/.8-1.0	2:1	
	1.2-1.4	3:1	
150.2-154.5	.8-1.0/1.0-1.2	4:1	
154.5-159.1	.8-1.0/1.0-1.2	4:1	Crust from 159.1-159.2
	.6-.8	2:1	
159.1-162.0	1.3-1.5/1.0-1.3	2:1	

Ross Ice Shelf Traverse  
 Station Site 39.5  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
162.0-166.7	1.5-2.0/2.0-4.0	3:1	Start of probable summer; loose grains Crust at 166.7-166.9
166.7-174.4	.8-1.0/1.0-1.2	2:1	
	.6-.8	3:1	
174.4-180.7	1.0-1.3/1.3-1.5	4:1	
	.8-1.0	2:1	
180.7-183.1	1.0-1.3/.8-1.0	3:1	



Ross Ice Shelf Traverse  
 Station Site 40.0  
 Date 11 February 1958  
 Observer Boyd

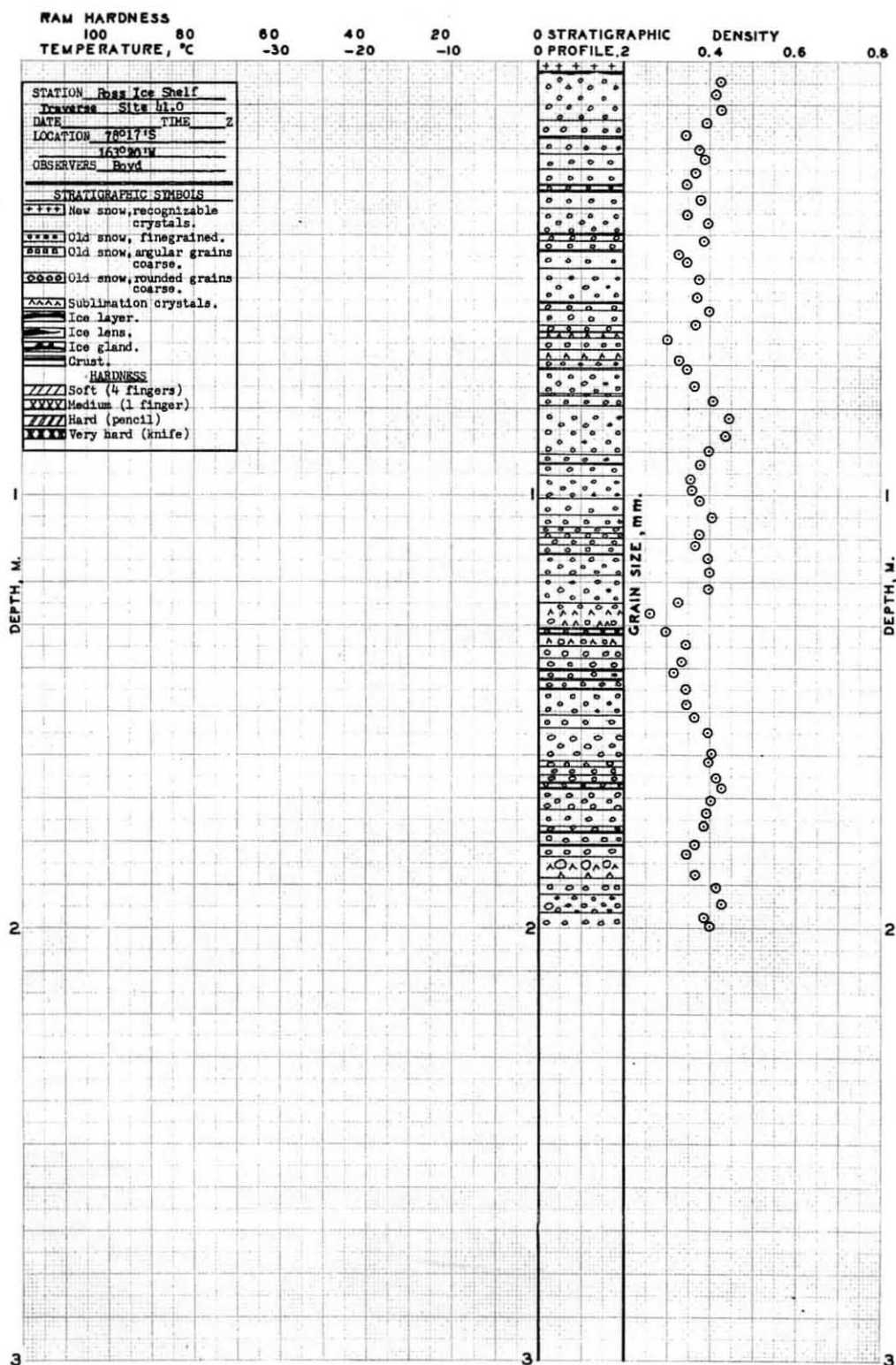
# STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 0.2	3.0-5.0		Loose new snow; crystal plates
0.2- 0.4	.3-.6		Crust of cemented grains
0.4- 2.3	1.0-2.0/2.0-4.0	3:1	Loose with air spaces; cup shaped crystals
2.3- 4.0	1.0-1.3/1.3-1.5	2:1	Crust at 2.3 and 4.0
4.0- 4.7	.6-.8/.8-1.0	3:1	Crust at 4.1 and 4.7-4.8
4.7- 6.1	.2-.6/.6-1.0	5:1	
6.1- 6.5	.3-.6		Ice layer with cemented grains
6.5- 10.2	1.0-1.2/.8-1.0	3:1	
10.2- 14.4	1.0-1.2/1.2-1.4	2:1	Crust from 10.2-10.4
14.4- 15.5	1.0-3.0/3.0-5.0	3:1	Loose with air space; cup shaped crystals
15.5- 17.2	1.0-1.2/.8-1.0	4:1	Cemented grains
17.2- 20.8	.8-1.0/.5-.8	4:1	
20.8- 21.3			Ice layer; varies in width
21.3- 23.7	2.0-4.0/1.0-2.0	3:1	Cemented grains
23.7- 29.0	1.0-3.0/3.0-6.0	2:1	Loose with air spaces; excellent cup shaped crystals
29.0- 30.1	1.5-2.0/2.0-3.0	4:1	Some cup shaped crystals; cemented grains with ice lens
30.1- 34.1	1.0-2.0/2.0-3.0	2:1	Some cup shaped crystals
34.1- 36.8	.8-1.0/.6-.8	4:1	Probably wind slab; lens formation
36.8- 40.7	2.0-3.0/1.0-2.0	2:1	Some cup shaped crystals crust from 40.7-40.9
40.7- 52.3	.8-1.0/1.0-1.2	3:1	Slight crust at 52.3-52.4
52.3- 57.4	3.0-5.0/5.0-8.0	4:1	Loose; cup shaped crystals; crust at 57.4-57.6
57.4- 63.1	1.0-3.0/3.0-4.0	4:1	Loose; cup shaped crystals
63.1- 65.4	1.0-1.2/.8-1.0	3:1	
65.4- 68.1	1.3-1.5/1.0-1.3	4:1	
68.1- 73.0	2.0-4.0/4.0-6.0	5:1	Loose; cup shaped crystals
73.0- 74.4	1.0-1.2/.8-1.0	3:1	Small ice layer; cemented grains
74.4- 76.3	2.0-3.0/1.0-2.0 occ. 4.0	3:1	Loose; cup shaped crystals
76.3- 78.6	.6-.8/.8-1.0	2:1	Slightly cemented
78.6- 81.7	2.0-4.0/1.0-2.0	3:1	Crust of cemented grains; cup shaped crystals; crust at 78.6-78.8
81.7- 86.8	1.0-2.0/2.0-3.0	2:1	Cup shaped crystals; crust at 86.8-86.9
86.8- 88.5	1.0-1.3/1.3-1.5	5:1	
88.5-100.2	1.0-2.0/2.0-4.0	3:1	Loose; some cup shaped crystals



Ross Ice Shelf Traverse  
 Station Site 40.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
100.2-116.8	.8-1.0/1.0-1.2	6:1	
	.6-.8	3:1	
116.8-119.5	1.0-1.3/.8-1.0	2:1	Crust at 119.5-119.7
119.5-123.8	1.0-1.2/1.2-1.4	3:1	
123.8-127.9	.8-1.0/1.0-1.2	4:1	
127.9-133.1	1.3-1.5/1.0-1.3	3:1	
133.1-134.5	1.3-1.5/1.0-1.3	2:1	Well cemented grains
134.5-142.4	1.0-1.2/1.2-1.4	5:1	
142.2-143.1			Ice lens; sparsely distributed
143.1-153.2	.6-.8/.8-1.0	3:1	Well packed; crust at 153.2-153.3
153.2-178.1	.8-1.0/1.0-1.2	4:1	
	.6-.8	2:1	
178.1-178.3	1.0-1.2/.8-1.0	3:1	
178.3-181.5	.6-.8/.8-1.0	4:1	
181.5-185.1	1.0-1.2/1.2-1.4	6:1	
	.8-1.0	3:1	Some cemented grains
185.1-193.8	1.0-3.0/3.0-5.0	3:1	Loose; some cup shaped crystals
193.8-197.7	1.3-1.5/1.5-1.7	2:1	
197.7-200.0+	1.0-1.3/1.3-1.5		Slightly cemented



Ross Ice Shelf Traverse  
 Station Site 41.0  
 Date \_\_\_\_\_  
 Observer Boyd

### STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size	Ratio	Remarks
0.0- 2.2	2.0-4.0		Loose new snow
2.2- 2.5			Lens of ice, varies in width and depth
2.5- 13.4	.3-.6/.6-.8	4:1	
13.4- 17.1	1.0-1.2/.8-1.0	3:1	Slight crust at 17.1
17.1- 21.1	1.0-1.2/1.2-1.4	3:1	
	.8-1.0	4:1	
21.1- 24.8	.2-.4/.4-.7	2:1	
24.8- 28.3	1.0-1.3/.8-1.0	4:1	Crust at 28.3-28.4
28.3- 29.5	.6-.8/.8-1.0	2:1	Ice layer at 29.5-29.6
29.5- 33.8	.4-.6/.6-.8	3:1	
	.8-1.0	5:1	
33.8- 39.8	.6-.8/.4-.6	4:1	Slight crust at 39.8
39.8- 41.1	.8-1.0/.6-.8	3:1	
41.1- 43.1	.8-1.0/1.0-1.2	4:1	Crust at 43.1-43.2
43.1- 47.5	1.0-1.3/.8-1.0	3:1	
47.5- 55.1	.4-.6/.6-.8	2:1	Ice layer from 55.1-55.4
	.8-1.0	4:1	
55.1- 57.1	.8-1.0/1.0-1.3	2:1	Summer zone; small ice gland and cemented grains
57.1- 60.7	.8-1.0/1.0-1.2	3:1	
60.7- 62.0	1.0-1.2/.6-.8	4:1	Ice layer at 62.0-62.3
	.8-1.0	2:1	
62.0- 63.7	2.0-4.0/1.0-2.0	2:1	Small ice gland and cemented grains; some cup shaped crystals
63.7- 66.3	1.0-1.3/.8-1.0	2:1	
66.3- 68.7	2.0-5.0/1.0-2.0	3:1	Some cup shaped crystals
68.7- 70.5	1.5-1.7/1.3-1.5	2:1	Crust from 70.5-70.6
70.5- 76.8	1.0-1.3/.8-1.0	3:1	
76.8- 77.0	1.3-1.5/1.0-1.3	2:1	
77.0- 79.2	.8-1.0/1.0-1.3	3:1	
79.2- 90.3	.6-.8/.8-1.0	2:1	
90.3- 92.6	.8-1.0/1.0-1.2	3:1	Crust at 92.6-92.8
92.6- 95.3	.7-1.0/1.0-1.3	2:1	
95.3-100.8	1.0-1.2/.8-1.0	2:1	
100.8-104.7	.8-1.0/.6-.8	3:1	
104.7-107.1	.6-.8/.4-.6	2:1	
	.8-1.0	4:1	
107.1-108.3	.8-1.0/.6-.8	3:1	
108.3-109.8	.6-.8/.4-.6	5:1	
	.8-1.0	2:1	
109.8-111.2	.8-1.0/1.0-1.2	5:1	
111.2-113.1	.8-1.0		Ice layer 113.1-113.2

Ross Ice Shelf Traverse  
 Station Site 41.0  
 (Continued)

Depth cm	Grain Size	Ratio	Remarks
113.1-118.2	.8-1.0/.6-.8	3:1	
118.2-124.8	.8-1.0/1.0-1.2	4:1	
124.8-130.4	1.0-3.0/3.0-5.0	3:1	Crust from 130.4-130.5; some cup shaped crystals
130.4-131.8	1.5-1.7/1.3-1.5	3:1	Crust at 131.8-131.9
	1.7-2.0	4:1	
131.8-134.8	1.7-2.0/2.0-4.0	3:1	Some cup shaped crystals
134.8-137.7	1.0-1.2/.8-1.0	2:1	
137.7-140.1	1.0-1.3/1.3-1.5	4:1	Slight crust at 140.1
140.1-142.2	1.3-1.5/1.0-1.3	2:1	Slight crust at 142.2
	1.5-1.7	4:1	
142.2-144.5	1.0-1.3/1.3-1.5	2:1	Crust at 144.5-144.6
	1.5-1.7	5:1	
144.5-150.8	1.0-1.3/.8-1.0	2:1	
	1.3-1.5	4:1	
150.8-153.8	1.3-1.5/1.0-1.3	2:1	
153.8-161.2	.8-1.0/1.0-1.2	4:1	
161.2-162.8	1.3-1.5/1.0-1.3	3:1	
162.8-164.7	.6-.8/.8-1.0	3:1	
164.7-166.1	1.0-1.2/1.2-1.4	4:1	Ice layer 166.1-166.3
166.1-167.4	.6-.8/.8-1.0	3:1	Ice layer 167.4-167.5; slightly cemented
167.4-172.7	.8-1.0/.6-.8	2:1	
172.7-176.3	1.0-1.2/.8-1.0	3:1	
176.3-177.3	1.0-1.2/1.2-1.4	5:1	Ice layer at 177.3-177.5
177.3-180.4	1.0-1.2/.8-1.0	2:1	Ice layer at 180.4-180.5
	1.2-1.4	4:1	
180.4-183.5	1.2-1.4/1.0-1.2	2:1	
183.5-188.6	1.0-3.0/3.0-6.0	2:1	Loose; some cup shaped crystals
188.6-192.1	1.4-1.5/1.2-1.4	3:1	
192.1-196.3	.8-1.0/1.0-1.2	3:1	
196.3-200.0+	1.0-1.2/occ. 1.4	5:1	
	.8-1.0	2:1	

## RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Station 41.1					
February 11, 1958					
0 - 10.5	2.3	101.6-103.2	29.2	24.7- 27.5	16.5
10.5- 11.9	5.8	103.2-105.1	41.0	27.5- 29.3	13.3
11.9- 12.4	12.2	105.1-107.1	94.2	29.3- 30.7	9.3
12.4- 13.9	15.5	107.1-109.1	139.2	30.7- 32.0	17.6
13.9- 16.0	30.8	109.1-112.1	110.9	32.0- 37.6	37.9
16.0- 17.0	72.2	112.1-115.8	85.3	37.6- 40.2	40.7
17.0- 18.6	77.2	115.8-121.2	70.9	40.2- 44.4	23.6
18.6- 20.0	73.6	121.2-122.8	54.2	44.4- 45.8	16.5
20.0- 23.1	66.7	122.8-125.0	49.7	45.8- 48.0	9.0
23.1- 24.1	62.2	125.0-129.1	72.5	48.0- 50.7	9.6
24.1- 25.2	56.7	129.1-130.2	86.0	50.7- 53.1	12.6
25.2- 26.3	56.7	130.2-134.1	55.5	53.1- 55.2	22.3
26.3- 29.1	30.8	134.1-134.3	104.2	55.2- 58.7	20.4
29.1- 30.4	17.6	134.3-135.8	30.9	58.7- 60.0	26.3
30.4- 32.1	11.0	135.8-141.0	33.0	60.0- 63.7	27.5
32.1- 33.5	9.3	141.0-144.1	62.3	63.7- 65.2	9.9
33.5- 35.8	8.7	144.1-146.5	87.6	65.2- 67.8	10.9
35.8- 37.6	16.1	146.5-149.4	93.8	67.8- 68.9	16.9
37.6- 39.1	22.2	149.4-150.5	15.1	68.9- 71.5	7.0
39.1- 41.8	20.7	150.5-153.8	95.1	71.5- 73.6	10.3
41.8- 47.2	26.3	153.8-155.0	79.2	73.6- 75.9	14.1
47.2- 50.3	31.3	155.0-157.0	104.2	75.9- 79.3	13.5
50.3- 52.9	17.6	157.0-160.3	113.3	79.3- 81.3	30.7
52.9- 55.3	14.7	160.3-162.1	70.9	81.3- 83.4	27.0
55.3- 60.6	21.1	162.1-163.6	44.2	83.4- 85.8	19.9
60.6- 62.8	30.5	163.6-166.1	24.2	85.8- 90.7	27.7
62.8- 66.0	28.2	166.1-171.1	30.2	90.7- 95.8	16.9
66.0- 68.0	38.2	171.1-173.2	23.3	95.8-100.6	18.8
68.0- 71.7	35.6	173.2-175.1	14.7	100.6-102.4	8.8
71.7- 75.2	34.6	175.1-178.0	18.0	102.4-110.8	55.3
75.2- 78.2	33.2	178.0-181.5	27.0	110.8-116.8	58.2
78.2- 80.0	25.4	181.5-184.2	37.5	116.8-120.7	39.0
80.0- 82.8	28.2	184.2-187.2	64.2	120.7-123.4	32.8
82.8- 84.1	34.0	187.2-190.5	49.7	123.4-125.8	28.2
84.1- 85.4	26.3	190.5-195.7	35.0	125.8-127.6	11.5
85.4- 86.7	57.0	195.7-199.7	34.2	127.6-131.5	4.5
86.7- 88.1	153.2			131.5-133.3	14.3
88.1- 89.0	92.2	Station 41.2		133.3-134.9	15.7
89.0- 89.8	78.2	February 13, 1958		134.9-137.1	11.9
89.8- 91.1	64.7	0 - 4.2	2.4	137.1-140.8	22.1
91.1- 91.8	31.8	4.2- 10.4	3.8	140.8-144.8	15.7
91.8- 93.4	15.7	10.4- 12.8	18.9	144.8-147.2	19.9
93.4- 95.5	12.7	12.8- 13.7	13.3	147.2-149.7	20.2
95.5- 97.6	28.0	13.7- 16.9	11.6	149.7-155.3	25.6
97.6-101.6	44.2	16.9- 18.9	7.2	155.3-158.4	36.5
		18.9- 21.1	6.8	158.4-162.7	46.1
		21.1- 24.7	7.8	162.7-165.3	35.0

# RAM HARDNESS DATA SHEET

Station Ross Ice Shelf Traverse  
 Observers Boyd

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
165.3-169.2	42.7				
169.2-170.3	40.6				
170.3-171.5	20.9				
171.5-175.7	23.3				
175.7-180.6	28.7				
180.6-185.6	32.2				
185.6-187.8	17.8				
187.8-189.7	14.7				
189.7-191.0	31.1				
191.0-193.1	51.9				
193.1-198.4	68.4				
198.4-201.3	52.5				
201.3-205.0	58.3				
205.0-210.2	79.2				